9-2350-230-10/981

TM 9-2350-230-10

# OPERATOR'S MANUAL (CREW)

FOR

ARMORED
RECONNAISSANCE/AIRBORNE
ASSAULT VEHICLE
FULL-TRACKED
152 MM GUN/LAUNCHER
M551 (2350-00-873-5408)
AND
M551A1 (2350-00-140-5151)

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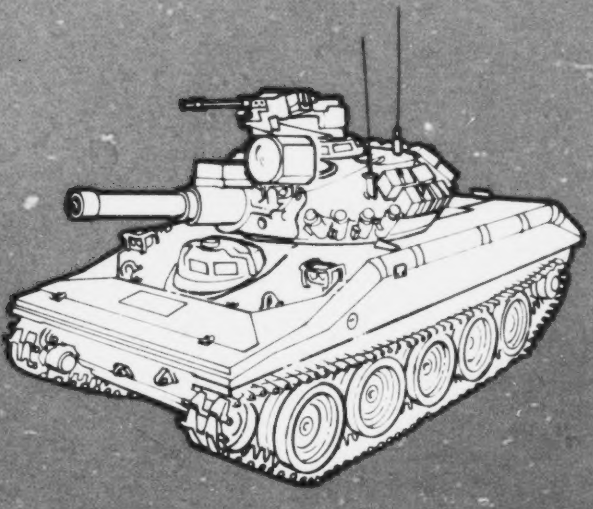

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *16 October 1981*

# Operator's Manual
# (CREW)
# For
# ARMORED RECONNAISSANCE/AIRBORNE ASSAULT VEHICLE, FULL-TRACKED 152MM GUN/LAUNCHER M551 (NSN 2350-00-873-5408) AND M551A1 (NSN 2350-00-140-5151)

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| None | 2-104.1/(2-104.2 blank) |
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TM 9-2350-230-10
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# Operator's Manual
# (CREW)
# For
# ARMORED RECONNAISSANCE/AIRBORNE ASSAULT VEHICLE, FULL-TRACKED 152MM GUN/LAUNCHER M551 (NSN 2350-00-873-5408) AND M551A1 (NSN 2350-0-140-5151)

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TM 9-2350-230-10
C 4

CHANGE
No. 4

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DEPARTMENT OF THE ARMY
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# Operator's Manual
# (CREW)
# For
# ARMORED RECONNAISSANCE/AIRBORNE ASSAULT VEHICLE, FULL-TRACKED 152MM GUN/LAUNCHER M551 (NSN 2350-00-873-5408) AND M551A1 (NSN 2350-00-140-140-5151)

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# Operator's Manual
# (CREW)
# For
# ARMORED RECONNAISSANCE/AIRBORNE ASSAULT VEHICLE, FULL-TRACKED 152MM GUN/LAUNCHER M551 (NSN 2350-00-873-5408) AND M551A1 (NSN 2350-00-140-140-5151)

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No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
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# Operator's Manual
# (CREW)
# for
# AR/AAV M551/M551A1 (SHERIDAN)

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| C-1 and C-2 | C-1 and C-2 |

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TM 9-2350-230-10
C 1

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No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 22 April 1977

# OPERATOR'S
# MANUAL (CREW)
# FOR
# AR/AAV M551/M551A1 (SHERIDAN)

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# WARNING

## CARBON MONOXIDE POISONING CAN BE DEADLY

CARBON MONOXIDE IS A COLORLESS, ODORLESS, DEADLY POISONOUS GAS, WHICH, WHEN BREATHED, DEPRIVES THE BODY OF OXYGEN AND CAUSES SUFFOCATION. EXPOSURE TO AIR CONTAMINATED WITH CARBON MONOXIDE PRODUCES SYMPTOMS OF HEADACHE, DIZZINESS, LOSS OF MUSCULAR CONTROL, APPARENT DROWSINESS, COMA. PERMANENT BRAIN DAMAGE OR DEATH CAN RESULT FROM SEVERE EXPOSURE.

CARBON MONOXIDE OCCURS IN THE EXHAUST FUMES OF FUEL-BURNING HEATERS AND INTERNAL-COMBUSTION ENGINES AND BECOMES DANGEROUSLY CONCENTRATED UNDER CONDITIONS OF INADEQUATE VENTILATION. THE FOLLOWING PRECAUTIONS MUST BE OBSERVED TO INSURE THE SAFETY OF PERSONNEL WHENEVER THE PERSONNEL HEATER, MAIN OR AUXILIARY ENGINE OF ANY VEHICLE IS OPERATED FOR MAINTENANCE PURPOSES OR TACTICAL USE.

1. DO NOT OPERATE HEATER OR ENGINE OF VEHICLE IN AN ENCLOSED AREA UNLESS IT IS ADEQUATELY VENTILATED.

2. DO NOT IDLE ENGINE FOR LONG PERIODS WITHOUT MAINTAINING ADEQUATE VENTILATION IN PERSONNEL COMPARTMENTS.

3. DO NOT DRIVE ANY VEHICLE WITH INSPECTION PLATES, COVER PLATES, ENGINE COMPARTMENT DOORS REMOVED UNLESS NECESSARY FOR MAINTENANCE PURPOSES.

4. BE ALERT AT ALL TIMES DURING VEHICLE OPERATION FOR EXHAUST ODORS AND EXPOSURE SYMPTOMS. IF EITHER ARE PRESENT, IMMEDIATELY VENTILATE PERSONNEL COMPARTMENTS, IF SYMPTOMS PERSIST, REMOVE AFFECTED PERSONNEL FROM VEHICLE AND TREAT AS FOLLOWS: EXPOSE TO FRESH AIR; KEEP WARM. DO NOT PERMIT PHYSICAL EXERCISE; IF NECESSARY, ADMINISTER ARTIFICIAL RESPIRATION; OBTAIN MEDICAL TREATMENT.

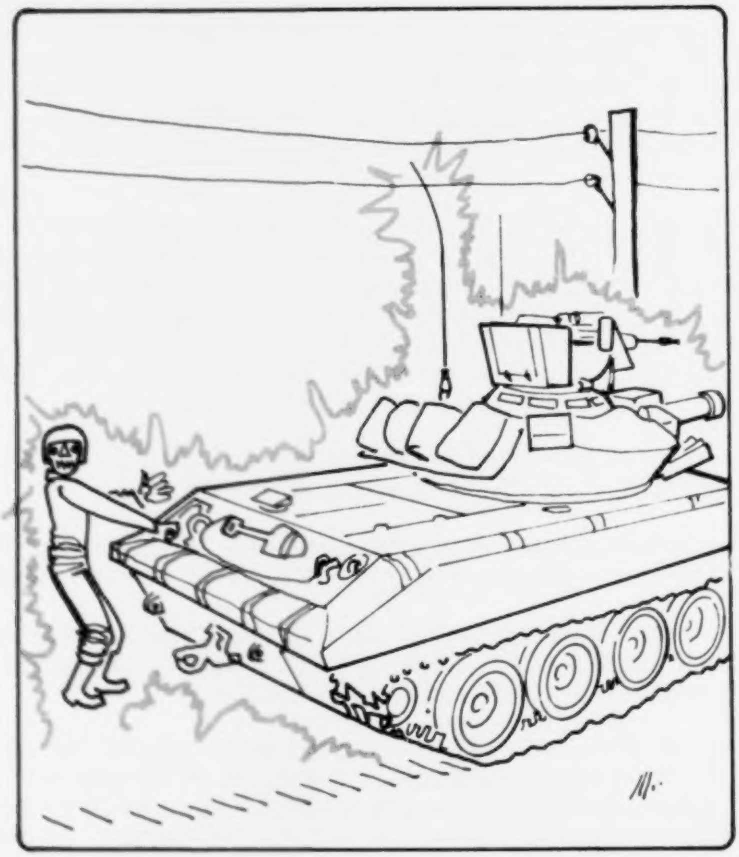
THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION.

WARNING: The M8A3 GAS-PARTICULATE FILTER UNIT WILL NOT PROTECT CREW AGAINST CARBON MONOXIDE POISONING.

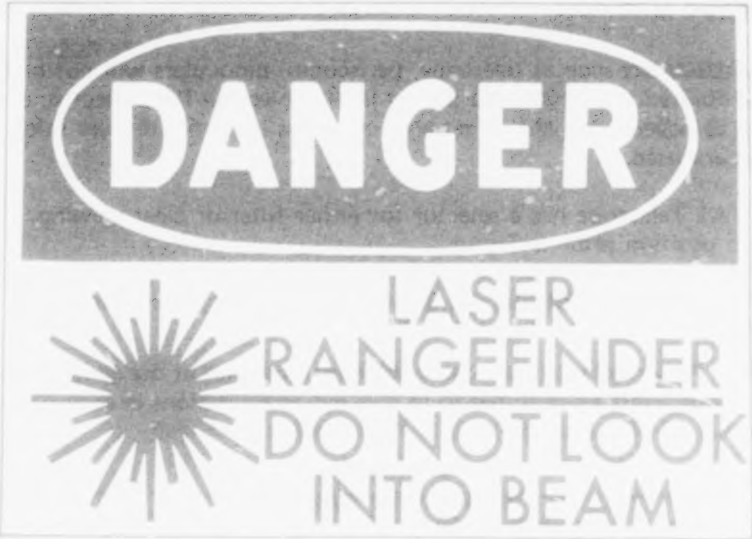
## ANTENNA WARNING

Before moving vehicle, check immediate area for overhead obstructions. If you think you're going to have a problem, tie antennas down.

Keep arms and legs from extending over side of vehicle. If an antenna contacts a power line while your body brushes against metal or wet objects (e.g., wet foliage or trees), then you're grounded . . . and you've HAD IT.



Don't work on the vehicle during an electrical storm or when a storm is threatening.



The laser beam of the laser range finder can be dangerous and cause blindness if it enters the eye, either directly or reflected from a shiny surface.

You must have had laser safety training prior to operation of the laser.

The laser range finder will be used only on ranges approved for and designated as laser firing ranges.

The cover on the external receiver/transmitter of the laser must be closed at all times except during actual lasing on approved ranges.

The precautions required for direct-fire, line-of-sight weapons must be enforced while operating the laser.

Laser operators will fire only at designated targets which are diffuse reflectors (non-reflective) and will not fire at reflective surfaces, such as glass, mirrors, windows, etc.

The laser will not be used in two-sided tactical exercises unless all personnel are equipped with appropriate laser eye protection and the maneuver area has been designated a laser firing range.

Laser protective eyewear must be worn by all personnel required to be down range of the laser. (Laser safety goggles, 4240-00-258-2054, meet safety requirement.)

The laser must NOT be fired at targets closer than 200 meters to the laser.

**Danger - Laser - continued.**

Optical instruments such as telescope, periscopes, binoculars will not be permitted to observe the target area during lasing unless all flat reflective surfaces have been removed from the target area or unless appropriate laser safety filters or goggles are used.

The M127A1 Telescope has a selector for either filter or clear viewing. The filter must be in position prior to lasing.

> **NOTE: TB MED 279 and AR 385-63 are the source documents for laser safety.**
>
> **NOTE: Personnel routinely performing maintenance at the general support and depot levels are required to receive eye examinations in accordance with AR 40-46.**

## WARNING
## RADIATION HAZARD

AZIMUTH INDICATOR
may contain dial pointers tipped with a coating
of radioactive material.
Hazardous radiation conditions exist
when the plastic dial window
is broken or removed from the indicator.

## AMMUNITION WARNING

Don't chamber 152-mm ammo until ready to fire. This ammo has highly flammable cartridge cases.

Keep ammo away from open flames, lighted cigarettes, smoldering residue, and other sources of ignition.

Never fire ammo with unauthorized fuzes. Check before loading.

## WARNING

> **Before crew leaves vehicle, make certain that MASTER switch and laser ON/OFF switch are in the OFF position. These switch settings prevent accidental automatic alignment of cupola to main gun.**

Technical Manual

No. 9-2350-230-10

* TM 9-2350-230-10

HEADQUARTERS,
DEPARTMENT OF THE ARMY
Washington, D. C. 10 June 1976

# OPERATORS
# MANUAL (CREW)
# FOR
# AR/AAV M551/M551A1 (SHERIDAN)

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes, or if you know a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) or test form located in the back of this manual direct to: Commander, US Army-Tank Automotive Command, ATTN: DRSTA-MBC, Warren, MI 48090. A reply will be furnished to you.

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* This manual supersedes TM 9-2350-230-10-1, 29 November 74, TM 9-2350-230-10-2-1, 31 March 73, TM 9-2350-230-10-2-2, 31 March 73, and, TM 9-2350-230-10-2-3, 6 June 74, including all changes to these manuals.

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# CHAPTER 1
# INTRODUCTION

## Section I. GENERAL

### 1-1. Purpose and Scope.

This manual is for your use in operating and maintaining the Armored Reconnaissance/Airborne Assault Vehicle (AR/AAV), commonly known as the Sheridan M551/M551A1. (See Figures 1-1 and 1-2, starting on page 1-2.) The manual is prepared so that all written material is visible under night environmental red-light conditions (red domelight/red-lens flashlight).

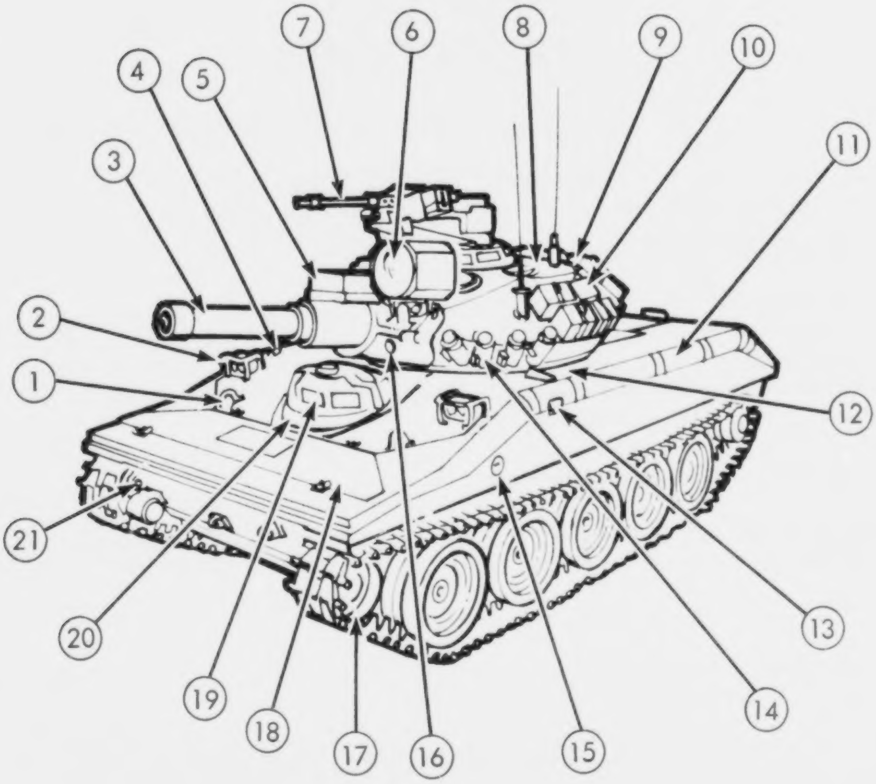
### 1-2. Maintenance Forms and Records.

Maintenance forms and records that you are required to use are explained in TM 38-750.

## Section II. DESCRIPTION AND DATA

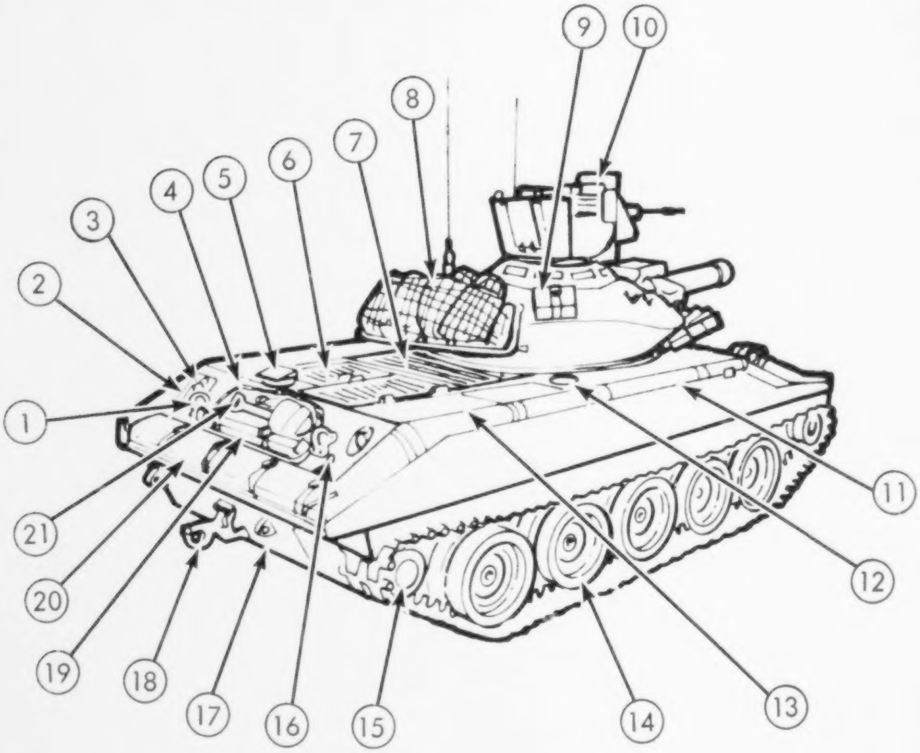
### 1-3. Description of Hull.

a. The AR/AAV M551/M551A1 is a lightweight, full-tracked, diesel-powered reconnaissance and assault vehicle. It is capable of amphibious operation and can be air transported and air delivered by heavy cargo aircraft. The M551 becomes M551A1 when equipped with the AN/VVG-1 laser range finder located in the cupola.



1. Front lifting eye (2)
2. Front headlight (2)
3. 152-mm gun/launcher
4. Personnel heater exhaust outlet
5. Missile subsystem transmitter door
6. Searchlight
7. Cal .50 machine gun
8. Loader's hatch cover
9. Water can
10. Cal .50 ammunition
11. Left side flotation barrier cover
12. Front bilge pump outlet
13. Flotation barrier step
14. M176 grenade launcher
15. Fixed fire extinguisher exterior actuator handle
16. 7.62-mm coaxial machine gun
17. Dual idler wheel (2)
18. Flotation surfboard
19. M47 periscope (3) or M48 periscope (in center for night vision)
20. Driver's rotatable hatch
21. Front tow eye (2)

**Figure 1-1. Armored Reconnaissance/Airborne Assault Vehicle (AR/AAV) M551/M551A1 - Left Front View**



1. Rear lifting eye (2)
2. Interconnect access door
3. Rear taillight (2)
4. Engine air-cleaner access door cover
5. Engine exhaust outlet
6. Engine compartment exhaust grille (2)
7. Engine compartment air intake grille
8. Turret stowage rack
9. Cal .50 ammunition
10. Commander's ballistic shield
11. Right-side flotation barrier cover
12. Fuel filler cap cover (2)
13. Battery access door cover
14. Dual road wheel (10)
15. Dual drive sprocket wheel (2)
16. Engine compartment bilge pump outlet (2)
17. Rear towing eye (2)
18. Towing pintle
19. Tow cable
20. Rear flotation barrier cover
21. Pioneer tools

**Figure 1-2. Armored Reconnaissance/Airborne Assault Vehicle (AR/AAV) M551/M551A1 - Right Rear View**

## 1-4. Tabulated Data for Hull.

a. General. The following are approximate weights and dimensions.

| | |
|---|---|
| Weight classification | No. 20 (tons) |
| Combat loaded weight | 36,000 lb |
| Curb weight (less fuel, crew, and basic issue items) | 28,525 lb |
| Overall length | 20 ft 8 in. |
| Overall width | 9 ft 2 in. |
| Overall height (over front ballistic shield plate) | 9 ft 8 in. |
| Ground clearance | 19 in. |

b. Performance.

| | |
|---|---|
| Maximum speed (fourth range) | 43 mph |
| Maximum speed (reverse) | 9 mph |
| Maximum grade (ascending or descending) | 60% |
| Maximum trench crossing width | 7 ft |
| Cruising range | 373 miles |
| Maximum vertical height | 33 in. |
| Minimum turning radius | Pivot |

c. Engine/Fuel System.

| | |
|---|---|
| Type | Diesel |
| Regular grade (DF-2) | +20° to +115°F |
| Winter grade (DF-1) | -25° to +20°F |
| Arctic grade (DF-A) | -25° to -65°F |

**NOTE: During emergency conditions, JP-5 aircraft turbine engine fuel may be used in lieu of diesel fuel.**

| | |
|---|---|
| Maximum fuel tank acceptance rate | 50 gpm |

d. Component Capacities (Approximate).

| | Refill | Dry |
|---|---|---|
| Engine lubricating system | 18 qt | 21 qt |
| Engine cooling system | 32 qt | 44-1/2 qt |
| Fuel tank capacity | 158 gal | |
| Transmission lubricating system | 57.6 qt | 69.6 qt |
| Compressor | 3/4 pt | 1 pt |

e. Engine Cooling System. Use additives as follows:

| | |
|---|---|
| Antifreeze (mixed with 50% water) | -40°F and above |
| Antifreeze (arctic type, full strength) | -40°F to -65°F |
| Corrosion inhibitor (22-1/2 oz per veh) | above +80°F |

## 1-4. Tabulated Data for Hull - continued.

f. Electrical System.

| | |
|---|---|
| Nominal Voltage | 24 vdc |
| Batteries | 4 |

g. Driver's Periscopes.

| | |
|---|---|
| M47 | 3 |
| M48 (infrared) | 1 |

## 1-5. Description of Turret.

a. Turret Armament. The turret traverses full circle (360°). It mounts a 152-mm gun/launcher which fires either conventional ammo or the Shillelagh missile. Mounted coaxially with the gun/launcher is a 7.62-mm machine gun and a gunner's telescope. Grenade launchers, four on each side of the turret, are used primarily for laying a smoke screen.

**NOTE: Your vehicle may be equipped with either the M73/M73A1 or M219 model 7.62-mm machine gun. Although both machine guns operate the same, some components are not interchangeable.**

b. Commander's Cupola. Mounted on top of the turret, the cupola can be traversed 360° independently of the turret. A cal .50 machine gun M2 mounts on top of the cupola.

c. Sighting and Fire Control.

1. Loader's periscope M37. This 1-power scope allows loader to scan-view the surrounding area.

2. Laser range finder AN/VVG-1. Mounted in the commander's cupola of the M551A1. The laser range finder determines the distance to target in meters. This improves your first hit capabilities with conventional ammo.

3. Gunner's periscope XM44 series. This 9-power scope is primarily used for night operation.

4. Telescope mount M149. Installed coaxially with the gun/launcher, this mount houses the gunner's telescope and missile infrared tracker. Its checksight allows alignment of the tracker with the telescope.

5. Gunner's telescope M127 or M127A1. Primarily used for daylight operation, the telescopes give you an 8-power or 12-power option.

## 1-5. Description of Turret - continued.

6. Quadrant M13A1C. Mounted on the gun/launcher, this instrument is used to measure elevation/depression.

7. Azimuth indicator (10954720). This instrument measures the deflection (azimuth) angle of the gun/launcher.

## 1-6. Tabulated Data for Turret.

a. Armament.

| | |
|---|---|
| 152-mm Gun/Launcher M81 Modified or M81E1 | |
| Recoil (conventional ammo) | 15 in. |
| Recoil (missile) | 5 in. |
| Elevation (max) | 336 mils (19°) |
| Depression (max) | –142 mils (–8°) |
| Missile weight | 62 lb |
| Conventional ammo weight | 49 lb |
| 7.62-mm Machine Gun M73/M73A1 or M219 | |
| Rate of fire (cycle) | 500-625 rounds per minute |
| Effective range (max) | 900 meters (tracer burnout point) |
| Method of target engagement | 20-30 round burst |
| Cal .50 Machine Gun M2 | |
| Refer to TM 9-1005-213-10 | |

b. Sighting and Fire Control.

| | |
|---|---|
| Periscope XM44 Series | |
| Magnification | 9X |
| Operable temperature range | -65° to +125°F |
| Laser Range Finder AN/VVG-1 | |
| Operating range | 200 to 4000 meters |
| Accuracy | within ± 10 meters |
| Operable temperature range | –80°F to +125F |
| Operable altitude range | to 10,000 feet |
| Telescope | |
| Magnification | 8X |
| Field of view | 8° |
| Minimum sustained rangings | 3 per minute sustained or 6 per minute for 2 minutes with 3-minute intervals between each 2-minute ranging period |

## 1-6. Tabulated Data for Turret - continued.

| | |
|---|---|
| Number of rangings from a fully charged power supply unit | 30 rangings minimum at 75° +15°F at a rate of 3 per minute for a maximum operating time of 10 minutes<br>10 rangings minimum at −25°F at a rate of 3 per minute for a maximum of 4 minutes. Minimum time between rangings: 4 seconds. |
| Reticle | 3 circles of 1, 5, and 20 milliradians |
| Telescope M127 or M127A1 | |
| Magnification | 8X and 12X |
| Operable temperature range | −65° to +125°F |

c. Auxiliary Equipment.

| | |
|---|---|
| Night Vision Sight AN/PVS-2 | 4X Magnification |
| or | |
| Night Vision Sight AN/TVS-2 | 7X Magnification |
| Range | Depending on surrounding light level |
| Operable temperature range | −65° to +125°F |
| Infrared Searchlight AN/VSS-3 or AN/VSS-3A | |
| Peak output (min) | 50 million candlepower |
| Weight | 62 lb |
| Radio and Intercom Equipment | |

**NOTE: The radio equipment includes a choice of radios. The intercom equipment is part of the vehicle electronic equipment wiring harness.**

| | |
|---|---|
| Radio Set AN/VRC-12 | |
| Frequency range | 30 to 75.95 megahertz |
| Radio power transmission | |
| High power | 35 watts (min) with range of approx 20 to 30 miles (approx 30 to 50 kilometers) |
| Low power | 1 to 4 watts with range of approx 5 miles (approx 8 kilometers) |
| Radio Set AN/VRC-64 | |
| Frequency range | 30 to 75.95 megahertz |
| Radio power transmission | 0.5 to 4 watts with range of 5 miles (approx 8 kilometers) |

## 1-6. Tabulated Data for Turret - continued.

| | |
|---|---|
| Intercom Equipment | |
| Intercommunication set AN/VIC-1(V) | Audio frequency amplifier AM-1780/VRC and crew member control boxes C-2296/VRC, C-2297/VRC, and C-2298/VRC |
| Helmet for each crew member | Combat vehicle crewman helmet with installed headset-microphone kit |

## 1-7. Tabulated Data for M8A3 Gas-Particulate Filter Unit

| | |
|---|---|
| (1) Weight | |
| M2A2 Air Purifier | 20-1/4 lbs (9.2 Kg) |
| M10 hose assy 4-ft (ea) | 2-1/4 lbs (1 Kg) |
| M6 hose assy 9-ft (ea) | 5-1/2 lbs (2.5 Kg) |
| (2) Dimensions | |
| M2A2 Air Purifier | 13" x 7-1/2" x 6" (33.02 x 190.5 x 15.24 cm) |
| Hose (I.D.) | 7/8" (2.2 cm) |
| (3) Electric Motor | |
| Horsepower | 1/20 |
| Current: | |
| ac | 27.5V, 60hz single phase |
| dc | 24V, 5a |
| Lubrication | Sealed bearings |
| Rotation | Counterclockwise |
| (4) Filter Air Delivery | 3.0 to 4.5 cubic feet per minute (84.9 to 127.4 liters per minute) of filtered breathable air at each mask. |
| (5) Personnel Protection | Four or fewer persons per M8A3 filter unit |

# CHAPTER 2
# OPERATING INSTRUCTIONS

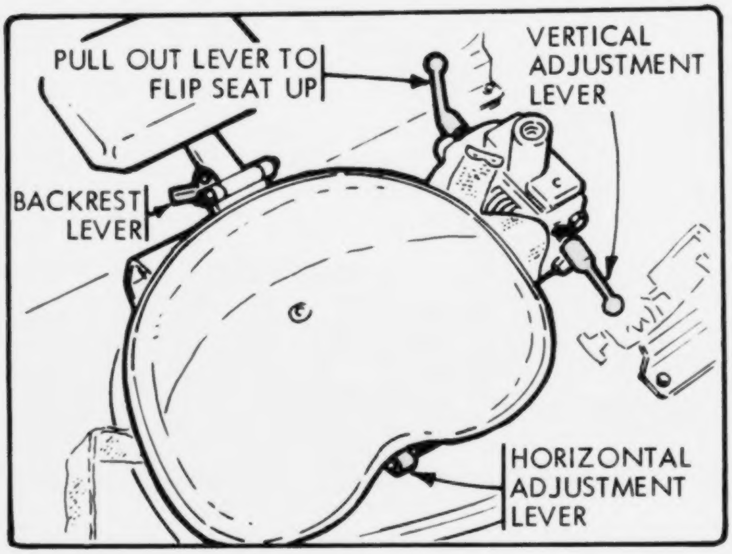
**WARNING: If equipment fails to operate, refer to troubleshooting procedures in chapter 3 (starting on page 3-34).**

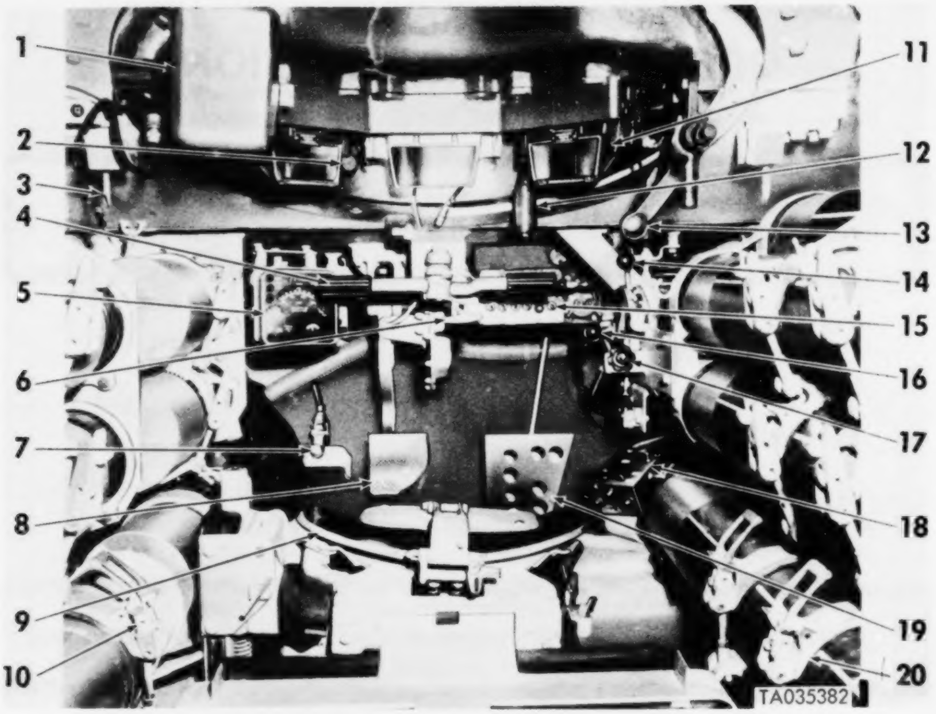
## Section I. OPERATING PROCEDURES

### 2-1. Familiarization.

Crew shall be familiar with location and operation of controls and instruments shown in figures 2-1 through 2-5 (starting on page 2-2).

**CAUTION: When raising or lowering driver's seat, keep body weight on seat.**


PULL OUT LEVER TO FLIP SEAT UP
VERTICAL ADJUSTMENT LEVER
BACKREST LEVER
HORIZONTAL ADJUSTMENT LEVER



1. Periscope washer liquid reservoir
2. Periscope washer pump
3. Hatch cover hold-open hook
4. Steer bar
5. Indicator panel
6. Parking brake lock handle
7. Headlight dimmer switch
8. Brake pedal
9. Driver's seat
10. Conventional ammunition stowage rack
11. M47 periscope (3)
12. Hatch cover handle grip
13. Hatch cover locking lever
14. Transmission shift lever
15. Driver's switch panel
16. Water steer lever
17. Hand throttle control knob
18. C-2297/VRC intercom set
19. Accelerator pedal
20. Missile stowage rack

**Figure 2-1. Driver's Compartment**

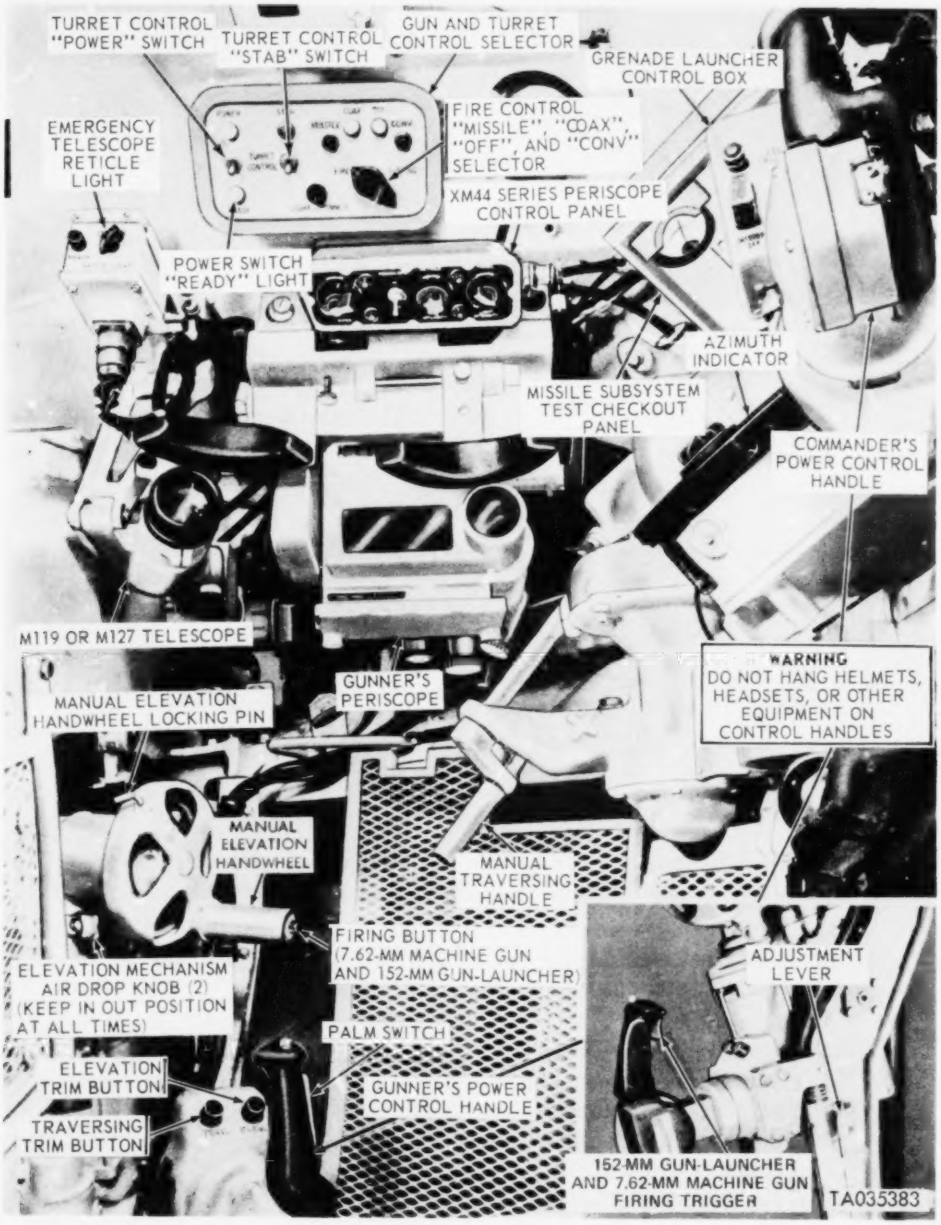
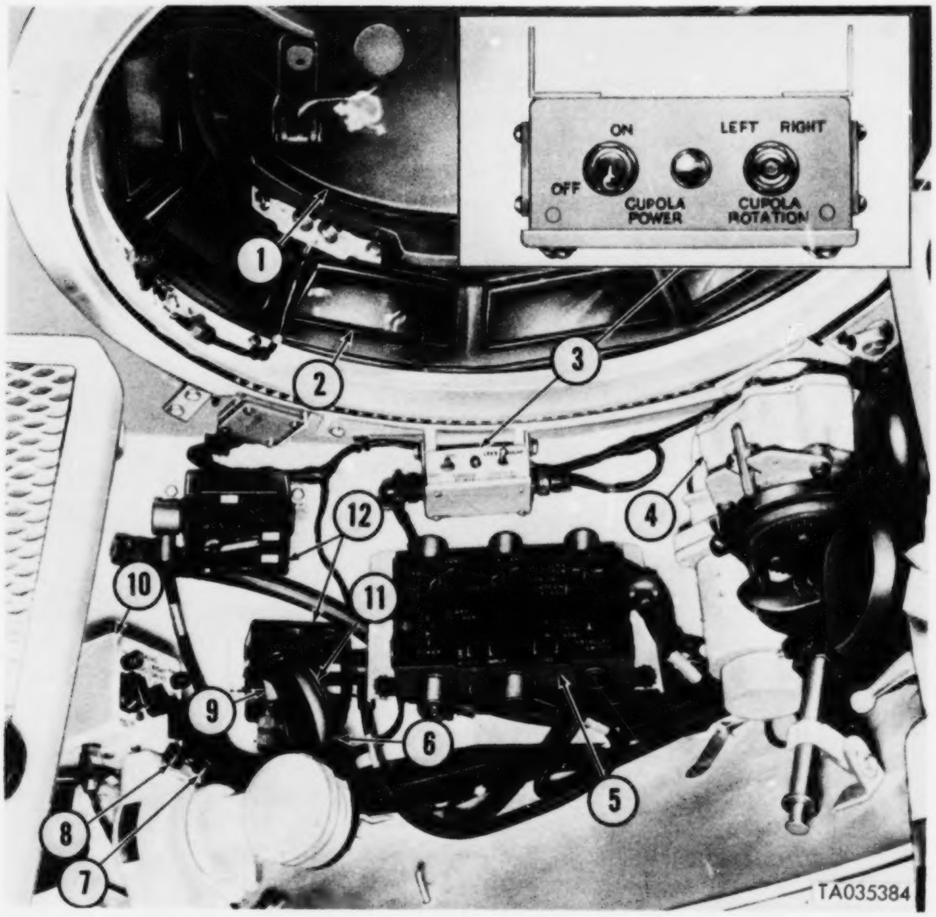
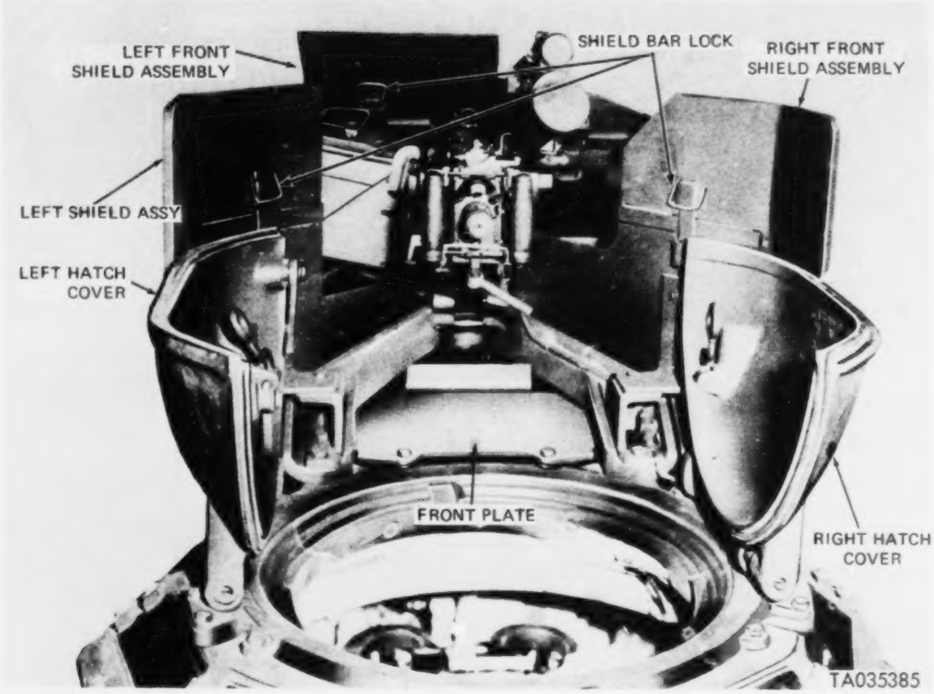

TURRET CONTROL "POWER" SWITCH
TURRET CONTROL "STAB" SWITCH
GUN AND TURRET CONTROL SELECTOR
GRENADE LAUNCHER CONTROL BOX
EMERGENCY TELESCOPE RETICLE LIGHT
FIRE CONTROL "MISSILE", "COAX", "OFF", AND "CONV" SELECTOR
XM44 SERIES PERISCOPE CONTROL PANEL
POWER SWITCH "READY" LIGHT
AZIMUTH INDICATOR
MISSILE SUBSYSTEM TEST CHECKOUT PANEL
COMMANDER'S POWER CONTROL HANDLE
M119 OR M127 TELESCOPE
WARNING
DO NOT HANG HELMETS, HEADSETS, OR OTHER EQUIPMENT ON CONTROL HANDLES
MANUAL ELEVATION HANDWHEEL LOCKING PIN
GUNNER'S PERISCOPE
MANUAL ELEVATION HANDWHEEL
MANUAL TRAVERSING HANDLE
FIRING BUTTON (7.62-MM MACHINE GUN AND 152-MM GUN-LAUNCHER)
ADJUSTMENT LEVER
ELEVATION MECHANISM AIR DROP KNOB (2) (KEEP IN OUT POSITION AT ALL TIMES)
PALM SWITCH
ELEVATION TRIM BUTTON
GUNNER'S POWER CONTROL HANDLE
TRAVERSING TRIM BUTTON
152-MM GUN-LAUNCHER AND 7.62-MM MACHINE GUN FIRING TRIGGER
TA035383

**Figure 2-2. Gunner's Controls and Instruments**


ON
OFF
LEFT
RIGHT
CUPOLA POWER
CUPOLA ROTATION
1
2
3
4
5
6
7
8
9
10
11
12
TA035384

1. Split hatch cover
2. Vision block (10)
3. Cupola control assembly
4. Cupola traverse mechanism
5. AM-1780/VRC audio frequency amplifier
6. Turret and gun/launcher power control handle
7. Elevation trim button
8. Traversing trim button
9. 152-mm gun/launcher and 7.62-mm machine gun firing trigger
10. Grenade projector control panel
11. Palm switch
12. C-2298/VRC control box

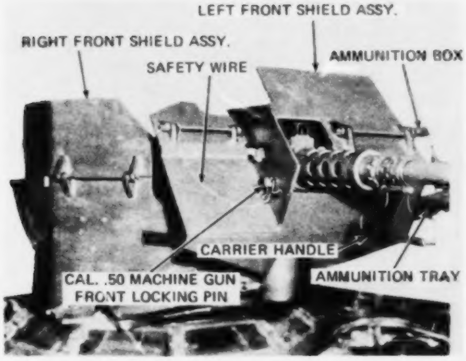
**Figure 2-3. Commander's Power Assist Cupola Controls, M551**


LEFT FRONT SHIELD ASSEMBLY
SHIELD BAR LOCK
RIGHT FRONT SHIELD ASSEMBLY
LEFT SHIELD ASSY
LEFT HATCH COVER
FRONT PLATE
RIGHT HATCH COVER
TA035385

CAUTION: Keep right-front shield up when firing machine gun.

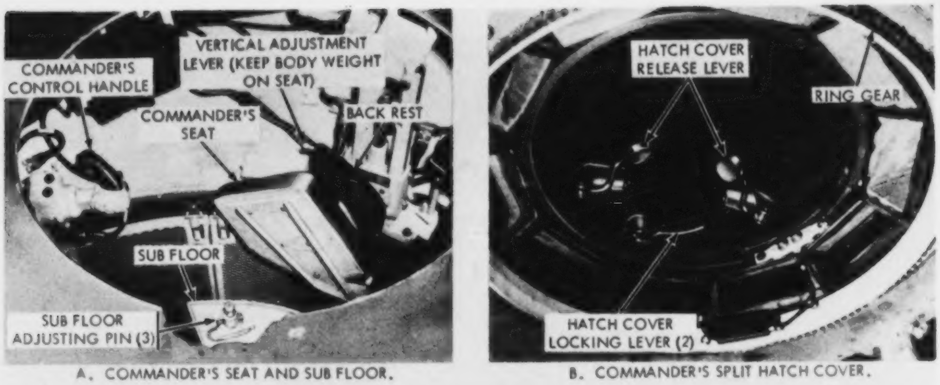
NOTE: To remove and install ammunition box and tray, position left front shield assembly in the upright position or lay forward.

NOTE: When operating cupola on side slopes, weight of ballistic shield may cause cupola to rotate after rotation switch has been released. If so, momentarily actuate the rotation switch in the opposite direction to bring cupola to a stop and allow brake to engage.


LEFT FRONT SHIELD ASSY.
RIGHT FRONT SHIELD ASSY.
SAFETY WIRE
AMMUNITION BOX
CARRIER HANDLE
CAL. .50 MACHINE GUN FRONT LOCKING PIN
AMMUNITION TRAY

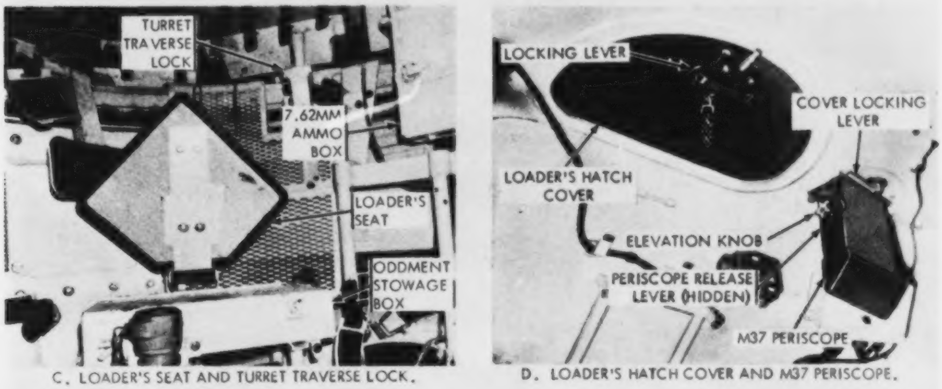
CAUTION: Carrier handle for Cal .50 barrel must always be installed in down position.

Figure 2-4. Commander's Ballistic Shield Plate Assemblies


COMMANDER'S CONTROL HANDLE
VERTICAL ADJUSTMENT LEVER (KEEP BODY WEIGHT ON SEAT)
COMMANDER'S SEAT
BACK REST
SUB FLOOR
SUB FLOOR ADJUSTING PIN (3)
HATCH COVER RELEASE LEVER
RING GEAR
HATCH COVER LOCKING LEVER (2)

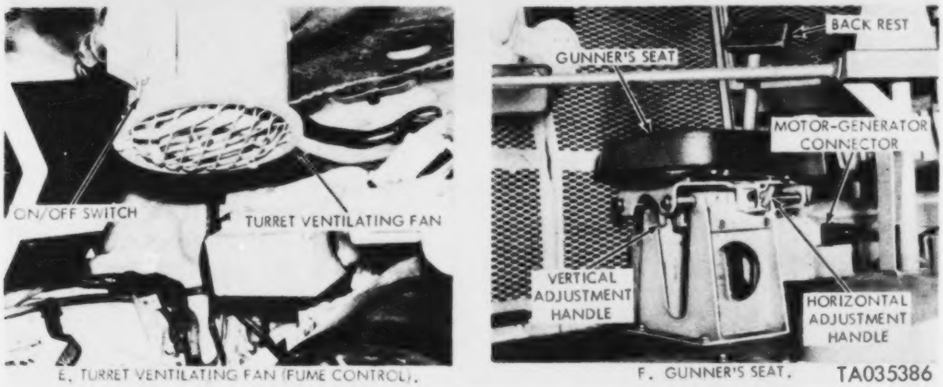
A. COMMANDER'S SEAT AND SUB FLOOR.

B. COMMANDER'S SPLIT HATCH COVER.


TURRET TRAVERSE LOCK
7.62MM AMMO BOX
LOADER'S SEAT
ODDMENT STOWAGE BOX
LOCKING LEVER
COVER LOCKING LEVER
LOADER'S HATCH COVER
ELEVATION KNOB
PERISCOPE RELEASE LEVER (HIDDEN)
M37 PERISCOPE

C. LOADER'S SEAT AND TURRET TRAVERSE LOCK.

D. LOADER'S HATCH COVER AND M37 PERISCOPE.


ON/OFF SWITCH
TURRET VENTILATING FAN
BACK REST
GUNNER'S SEAT
MOTOR-GENERATOR CONNECTOR
VERTICAL ADJUSTMENT HANDLE
HORIZONTAL ADJUSTMENT HANDLE

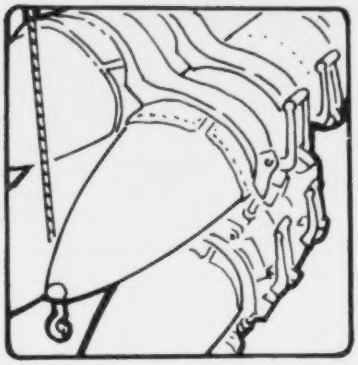
E. TURRET VENTILATING FAN (FUME CONTROL).

F. GUNNER'S SEAT.

TA035386

**Figure 2-5. Turret Miscellaneous Controls**

## 2-2. Prestarting Instructions.



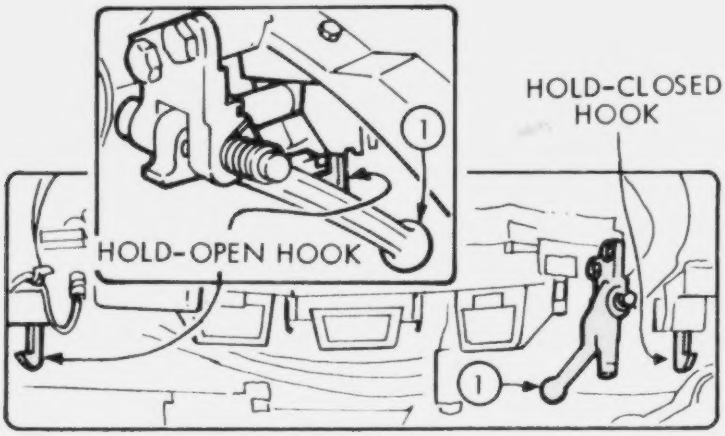
a. Perform before-operation preventive maintenance check and service (PMCS) presented in chapter 3, section II (page 3-6).

b. Secure turret traverse lock.

c. Make certain that missiles and ammunition are properly stowed.

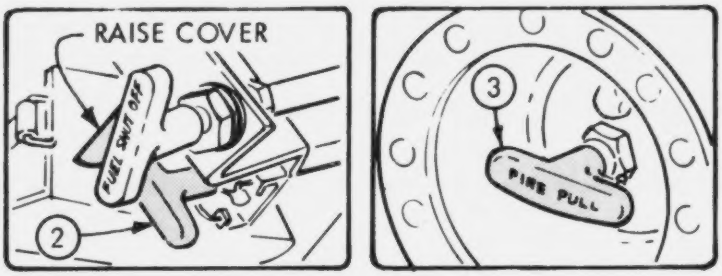
d. Turn off all communication and accessory switches.

e. If required for night vision, install M48 periscope (paragraph 2-3, page 2-11).


HOLD-CLOSED HOOK
1
HOLD-OPEN HOOK
1

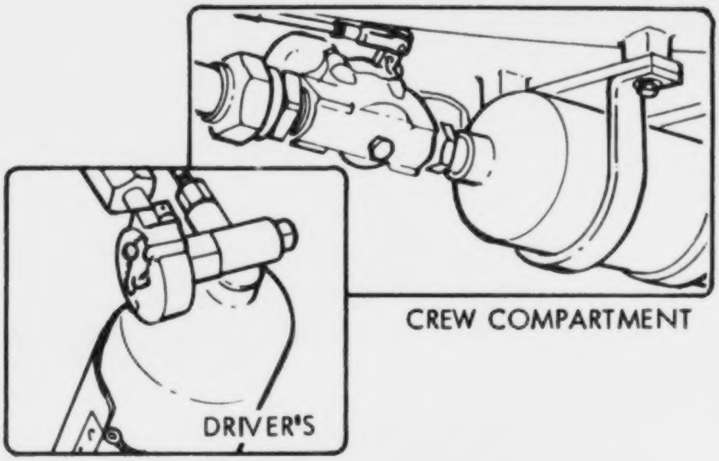
f. Secure driver's hatch cover in open or closed position. Push lever (1) up to lock (down to unlock).

g. Open both fuel tank valves at engine-to-turret bulkhead.


RAISE COVER
FUEL SHUT OFF
2
3
FIRE PULL

h. Make sure interior (2) and exterior (3) fire extinguisher actuating handles are safety wired.

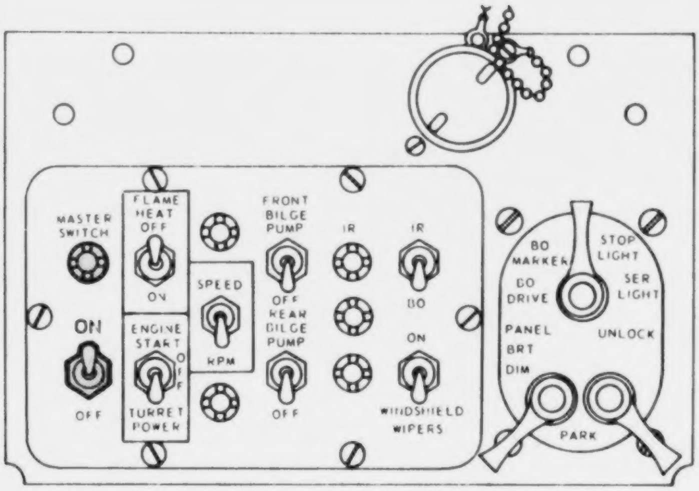
**2-2. Prestarting Instructions - continued.**


CREW COMPARTMENT
DRIVER'S

i. Check safety wiring on driver's and crew compartment fire extinguishers (located behind driver and in turret).

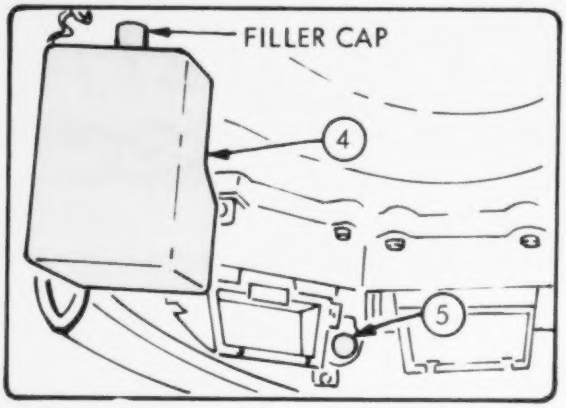
j. Know where portable fire extinguisher is and how it works . . . just in case.

**NOTE: See paragraphs 2-55 thru 2-58 on pages 2-142 thru 2-145 for operation and maintenance of all fire extinguishers.**


MASTER SWITCH
ON
OFF
FLAME HEAT OFF
ON
ENGINE START
OFF
TURRET POWER
SPEED
RPM
FRONT BILGE PUMP
OFF
REAR BILGE PUMP
OFF
IR
IR
BO
ON
WINDSHIELD WIPERS
BO MARKER
STOP LIGHT
BO DRIVE
SER LIGHT
PANEL
BRT
DIM
UNLOCK
PARK

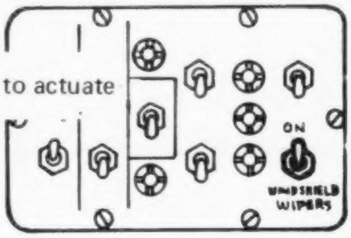
k. Turn MASTER SWITCH on. MASTER SWITCH lamp will light.

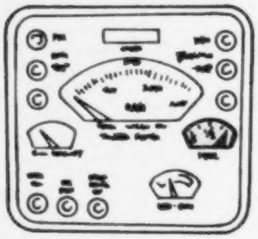
## 2-2. Prestarting Instructions - continued.



l. Check operation of driver's periscope washers and wipers as follows:

1. Make sure liquid reservoir (4) is filled.
2. Push in washer pump plunger (5) to spray windows.
3. Turn WINDSHIELD WIPERS switch ON to actuate wipers.

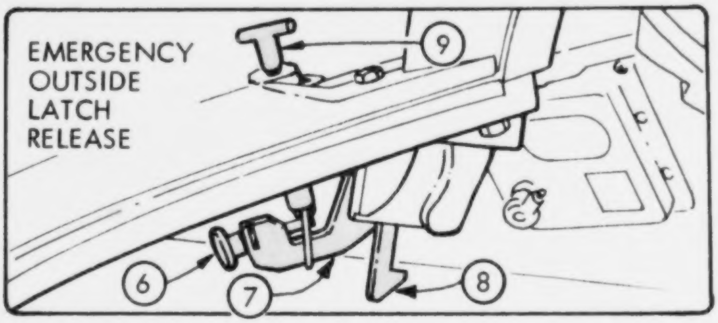




m. Check FUEL gage. Add fuel if required.

**CAUTION: Do not run completely out of fuel. Injectors require full return flow for cooling.**

**NOTE: Be sure you know how to operate your emergency outside latch release and the open position latch stop.**



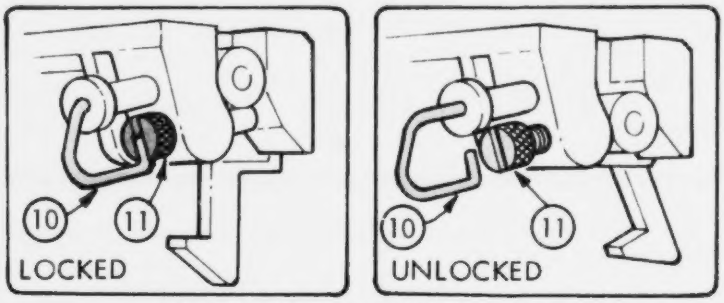
n. To open hatch from inside pull out latch stop (6) and push up hook arm (7) to release latch hook (8).

o. To close hatch from inside, pull out latch stop (6) before rotating hatch to close and lock. Then, push in latch stop (6) to lock latch hook (8).

p. To open from outside turn external handle (9) counterclockwise six or more full turns, then pull up to release latch hook (8).

q. Reset by turning handle (9) clockwise six full turns.

**CAUTION: Always reset before operating vehicle.**



OPEN POSITION LATCH STOP

r. To lock hatch cover open first push latch cover locking lever (1) to locked position. Then pull handle (10) clear of thumbscrew (11) notch and turn thumbscrew clockwise to locked position. Put handle (10) back in slot.

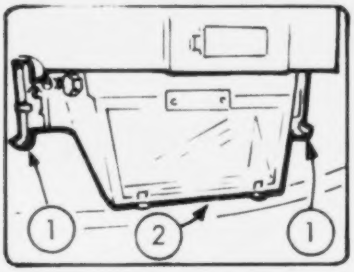
## 2-2. Prestarting Instructions - continued.

s. To close hatch cover pull handle (10) clear of thumbscrew (11) notch and turn thumbscrew counterclockwise to unlocked position. Then release locking lever and rotate hatch cover.

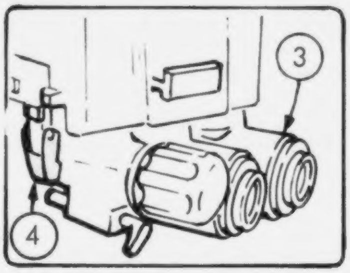
**WARNING: When operating vehicle with hatch open, positive latch must be in locked position.**

## 2-3. Installation/Removal of M48 Periscope.

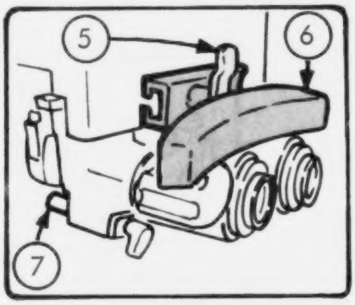
**CAUTION: Vehicle MASTER SWITCH must be OFF for installation/ removal of periscope.**



a. Release two catches (1) holding center M47 periscope body (2) to mount. Remove body.



b. Install M48 periscope (3) by pushing up against head. Secure to mount with two catches (4).

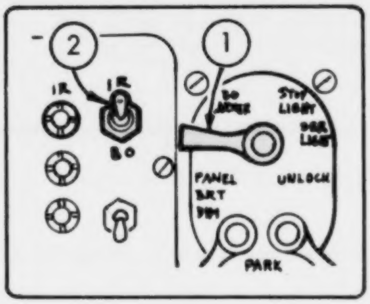


c. Pull out slide adjusting plunger (5) and install headrest (6).

d. Connect vehicle power supply cable to periscope plug (7).

**NOTE: Remove the M48 periscope in the reverse order of installation.**

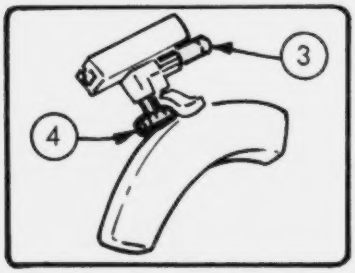
## 2-4. Operation of M48 Periscope.


2
1
I.R.
I.R.
B.O
STOP LIGHT
PANEL
BRT
DIM
UNLOCK
PARK

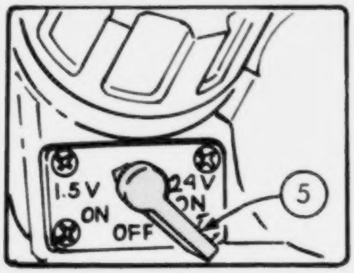
a. MASTER SWITCH must be on.

b. Place main light switch (1) in BO DRIVE. Push switch (2) to IR.

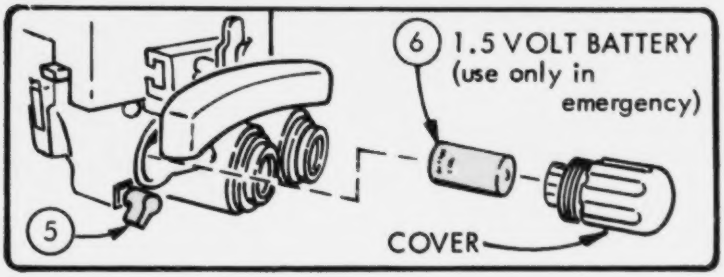
**CAUTION: Don't touch optics. Oil and acid from your fingers will etch; remove fingerprints with soft clean cloth.**



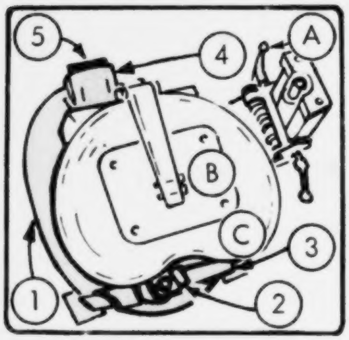
c. Adjust headrest with swivel knob (3) and linear adjusting knob (4).

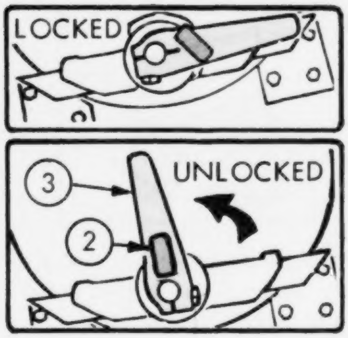

1.5V
ON
OFF
24V
ON
5

d. When using vehicle power, place IR power switch (5) to 24V ON. When using battery (6) power, place IR power switch (5) to 1.5V ON.


6
1.5 VOLT BATTERY
(use only in
emergency)
5
COVER

## 2-5. Emergency Exits.





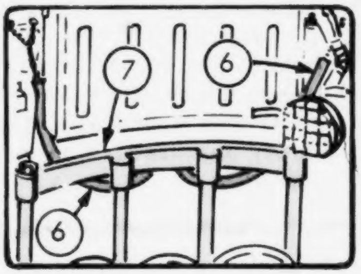
a. In an emergency, you can escape through driver's escape hatch (1) (if belly armor is not present) by lowering seat backrest (B) and then pulling lever (A) to lift seat (C), unscrewing locking pin (2) and moving lever (3) to the rear. The hatch cover will drop out.

b. It takes two men to install the cover. From beneath vehicle, lift cover into place in hatch opening with lug (4) hooked over hatch support block (5). Align cover in opening and push to rear as far as possible. Move lever (3) to latched position. Screw locking pin (2) down.

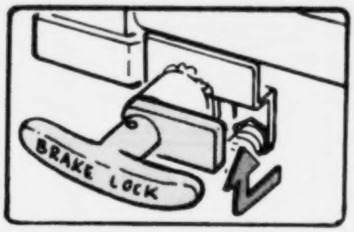
**CAUTION: If lever is easy to move into latched position, notify organizational maintenance (cover isn't sealed).**

**CAUTION: Do not operate vehicle without locking pin screwed down.**

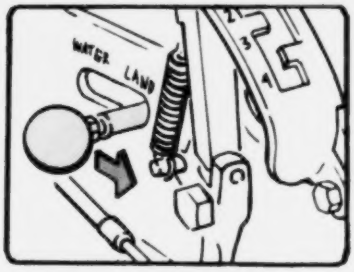
c. You can also escape through the turret by traversing gun/launcher to 90° left position, pulling safety chain (6) and removing ammo rack (7). The screens are also removable.



## 2-6. Starting Vehicle.



a. Depress service brake pedal and pull out and up on parking BRAKE LOCK handle to set brake.

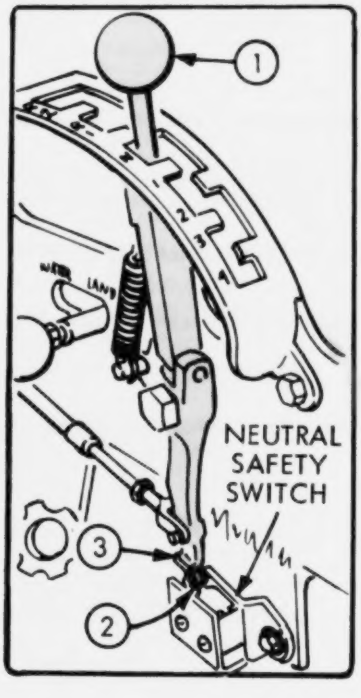


b. Pull WATER/LAND steer shift control to LAND.

**WARNING: Maintain pressure on brake pedal when releasing brake.**

**WARNING: Be sure WATER/ LAND steer shift control is at LAND to prevent damage to transmission and possible loss of vehicle control.**

c. Place transmission shift control (1) to N (neutral).



**CAUTION: Neutral safety switch roller (2) should contact shift control lever (3) near center of actuating end when transmission shift control (1) is in neutral. The switch roller (2) should not contact in all other shift positions. If it does, notify organizational maintenance.**

This page intentionally left blank.

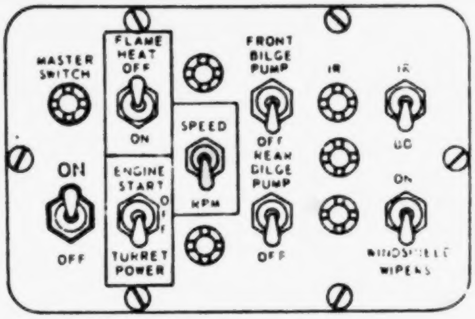
CHECK FOR HYDROSTATIC LOCK

Before starting, always check for hydrostatic lock by intermittently bumping the starter switch with the fuel cutoff control pulled out (cutoff position). Indications of hydrostatic lock can be:

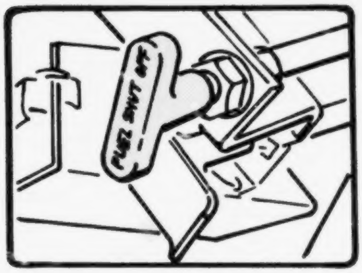
(1) Engine starts to turn over with the starter then stops cranking.
(2) When cranking the engine the starter will sound as if it were straining.
(3) Engine appears to bind-up.

NOTE: When hydrostatic lock is suspected or exists, stop cranking immediately and notify supporting maintenance.

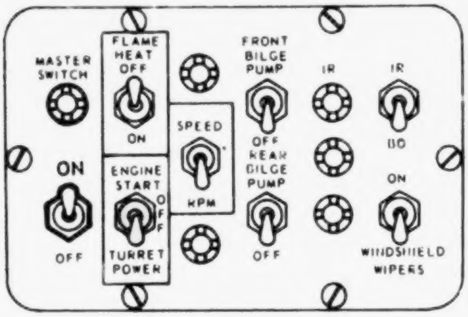
**2-6. Starting Vehicle - continued.**


MASTER SWITCH
FLAME HEAT
OFF
ON
FRONT BILGE PUMP
IR
IR
SPEED
ON
ENGINE START
OFF
RPM
OFF
REAR BILGE PUMP
UO
ON
OFF
TURRET POWER
OFF
WINDSHIELD WIPERS

d. Push SPEED/RPM switch to RPM.


FUEL SHUT OFF

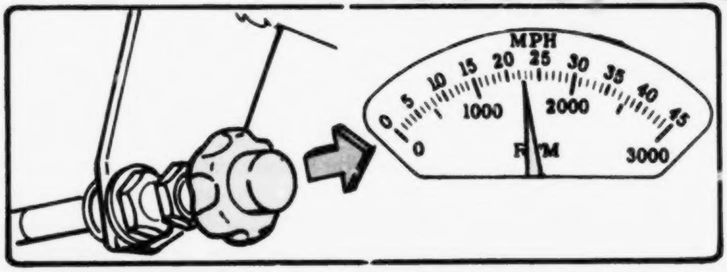
e. Make sure FUEL SHUT OFF knob is pushed in.


MASTER SWITCH
FLAME HEAT
OFF
ON
FRONT BILGE PUMP
IR
IR
SPEED
ON
ENGINE START
OFF
RPM
OFF
REAR BILGE PUMP
UO
ON
OFF
TURRET POWER
OFF
WINDSHIELD WIPERS

f. Press ENGINE START switch to START.

**CAUTION: Do not crank engine for more than 30 seconds. If engine does not start within 30 seconds, wait 30 seconds before pressing start switch again. If engine does not start after fifth attempt, see organizational maintenance.**

CAUTION: Check for hydrostatic lock (page 2-14.2)

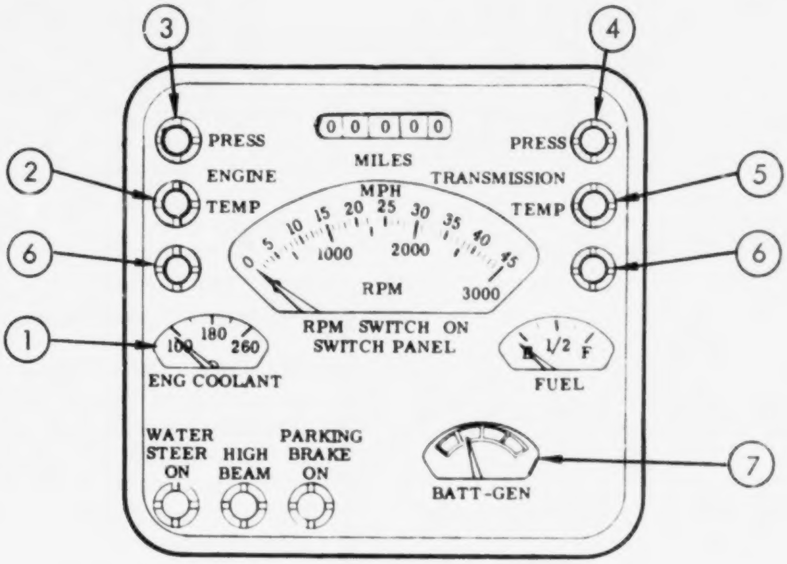

MPH
0
5
10
15
20
25
30
35
40
45
1000
2000
0
RPM
3000

g. When engine starts, return ENGINE START switch to OFF position; pull out hand-throttle control knob to 1500 rpm on tachometer (fast idle) for 5 seconds; place ENGINE START switch to TURRET POWER position; and, allow power plant to warm-up 3 to 5 minutes.

h. Push SPEED/RPM switch to SPEED.

i. During engine warmup, refer to driver's indicator panel checkout procedure, (paragraph 2-7, starting on page 2-16).

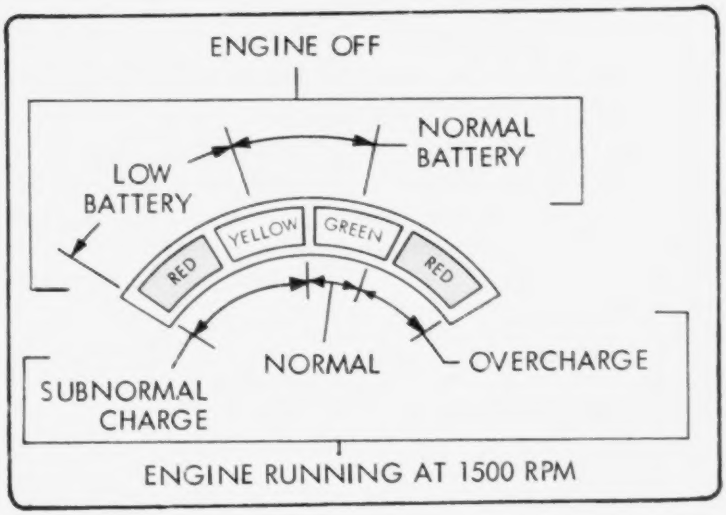
## 2-7. Driver's Indicator Panel Check Procedure.


3
4
PRESS
0 0 0 0 0
PRESS
2
ENGINE
MILES
TRANSMISSION
5
TEMP
MPH
TEMP
0 5 10 15 20 25 30 35 40 45
1000
2000
6
6
RPM
3000
1
180
100
260
RPM SWITCH ON SWITCH PANEL
E
1/2
F
ENG COOLANT
FUEL
WATER STEER ON
HIGH BEAM
PARKING BRAKE ON
7
BATT-GEN

| Indicator No. and Name | Purpose/Procedure |
|---|---|
| 1. ENGINE COOLANT gage | Indicates engine coolant temperature (175 to 210°F is normal). |
| 2. ENGINE TEMP light | Indicates engine temperature. Lights if temperature reaches 225°. If light goes on, check ENGINE COOLANT gage (1), stop engine and refer to troubleshooting (page 3-35). |
| 3. ENGINE PRESS light | Signals possible engine oil pressure problems. If light stays on when tachometer registers 1500 rpm, kill the engine and start troubleshooting (page 3-35). |
| 4. TRANSMISSION PRESS light | Signals possible transmission oil pressure problems. If the light stays on when the tachometer registers 1500 rpm, kill the engine and start troubleshooting (page 3-35). |
| 5. TRANSMISSION TEMP light | Signals possible overheating of the transmission. If the light goes on shift into neutral and idle at 1300 rpm for 3 minutes and if the light remains on, stop the engine and notify organizational maintenance. |

## 2-7. Driver's Indicator Panel Check Procedure - continued.

| Indicator No. and Name | Purpose/Procedure |
|---|---|
| 6. Panel light (two) | Illuminates panel whenever MASTER SWITCH is on. |
| 7. BATT-GEN gage | Indicates generator charging. If MASTER SWITCH is on and engine off, needle should be between NORMAL and LOW battery. If engine is running, needle should be NORMAL range except for brief swing into OVERCHARGE range on startup. If needle remains in yellow caution range or OVERCHARGE or SUBNORMAL range, stop engine and report to organizational maintenance. |

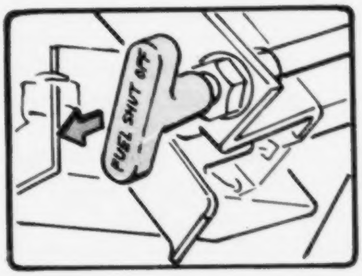

ENGINE OFF
NORMAL BATTERY
LOW BATTERY
YELLOW
GREEN
RED
RED
NORMAL
OVERCHARGE
SUBNORMAL CHARGE
ENGINE RUNNING AT 1500 RPM

## 2-8. Manual Lockup of Cooling Fan Drive.

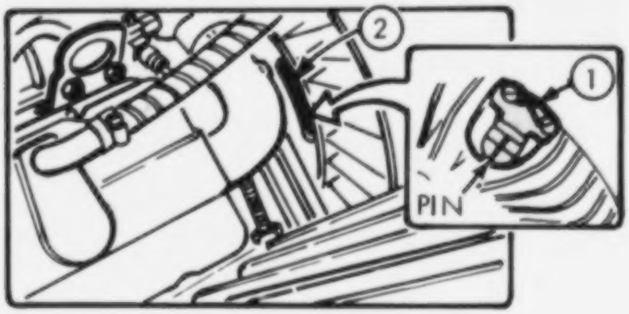
**NOTE: Follow this procedure only in an emergency when the engine is overheated (because of fan clutch failure) and you can't fix it, but you still have to drive the vehicle. Notify organizational maintenance immediately.**

a. Pull out engine FUEL SHUTOFF control handle.

b. Open right exhaust grille.


FUEL SHUT OFF

## 2-8. Manual Lockup of Cooling Fan Drive - continued.



c. Have someone intermittently engage starter until fan drive manual lock-up device (1) appears inside stator slot (2).

**NOTE: To see the lock-up device, you have to lie on engine compartment and shine a flashlight into the slot.**

d. Turn MASTER SWITCH to OFF.

e. Depress pin on fan drive manual lockup device (1) with screwdriver and rotate fan blades by hand until pin drops into clutch.

f. Rotate pin 90° to lock pin down under tab.

## 2-9. Fan-Clutch Functional Check with Cold Engine (Coolant Temperature Below 100°F).

a. Operate engine at idle speed (700 rpm).

b. Observe fan drive belt rotation at A (see page 2-19).

c. Observe fan rotor blade rotation at C.

d. While observing belt and rotor rotation, have someone stop engine.

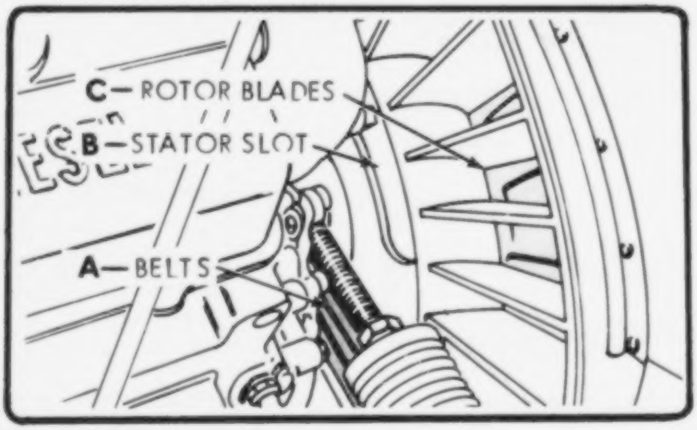
e. When drive belt rotation stops with a rocking action, fan rotor blades should continue to spin (free wheel) for a few seconds.

**NOTE: Fan drive manual lock-up device must be disengaged at all times EXCEPT during emergency operating condition.**

f. If fan rotor does not free wheel, check fan drive manual lock-up device for proper DISENGAGED position.

### 2-9. Fan-Clutch Functional Check with Cold Engine - continued (Coolant Temperature Below 100°F).

g. If lock-up device is disengaged, and rotor blades cannot be turned freely (by finger) when the engine is COLD, request detailed testing by organizational maintenance.



### 2-10. Fan-Clutch Functional Check with Hot Engine (Coolant Temperature Above 175°F).

a. Same procedures as for COLD engine except that fan rotor blade will rotate with heavy drag at 180°F and will automatically lock at 225°F.

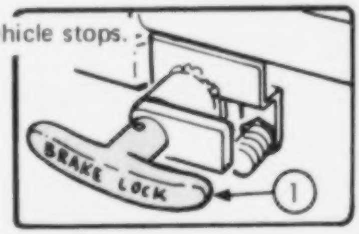
b. While observing belt and rotor blades during engine shut down and checking that the drive belts stop with rocking action, rotor should slow to a stop within two seconds.

c. With engine shut down (MASTER SWITCH at OFF and fuel cutoff pulled out), rotor should be difficult to move with a finger at 180°F.

**NOTE: Fan clutches without blue markings at rear of clutch will be operated in locked-up mode at all times.**

### 2-11. Stopping Procedure.

a. Release accelerator and depress brake until vehicle stops.



b. With brake depressed, put shift lever in neutral. Pull out and up on parking BRAKE LOCK handle (1).

c. Push SPEED/RPM switch to RPM (page 2-15).

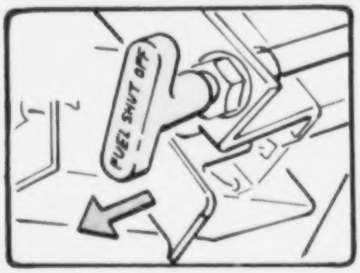
**2-11. Stopping Procedure - continued.**

d. Set hand throttle control knob to run engine at 1000 rpm for 5 minutes to provide uniform distribution of engine heat (see page 2-15).

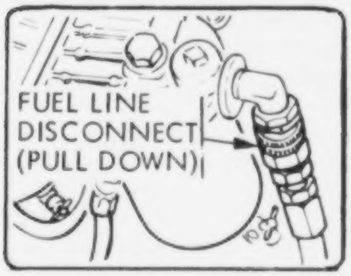
e. Push throttle hand control knob in to return engine to normal idle (650-700 rpm).

f. Turn radio and all accessories off.

g. Pull out FUEL SHUT OFF control handle (left of driver) to stop engine.



**CAUTION: Do not apply excessive pull on handle.**



**NOTE: If FUEL SHUT OFF control doesn't stop engine, open engine exhaust grille and disconnect fuel line by pulling down at primary fuel filter.**

h. Turn MASTER SWITCH off.

i. Perform after-operation PMCS (starting on page 3-6).

**2-12. Operation Under Normal Conditions on Land.**

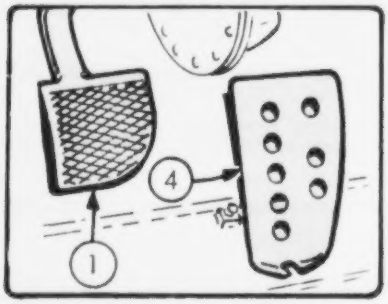
**WARNING: If a track is thrown while operating vehicle, do not apply brake. Coast to a stop.**

## 2-12. Operation Under Normal Conditions on Land - continued.

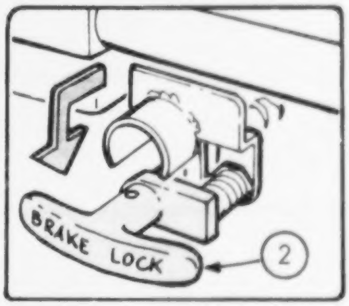
CAUTION: Keep gun/launcher straight forward when traveling through wooded areas to prevent damage to grenade launchers.

CAUTION: Never leave the driver's compartment while engine is running.

CAUTION: To prevent damage and overheating of engine and transmission when starting from halt, begin with transmission in lowest range.

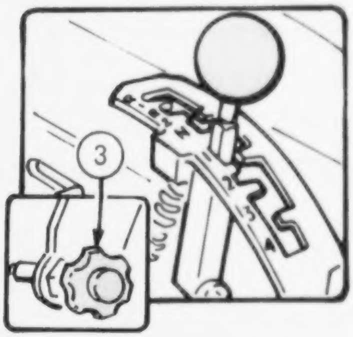


a. Apply pressure on brake pedal (1).



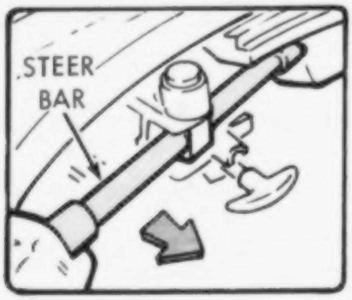
b. Pull out and down on BRAKE LOCK handle (2) to release brake.

c. With brake pedal depressed and hand throttle control knob (3) pushed in, shift from N to 1, release brake pedal (1), and step on accelerator pedal (4) to achieve desired speed. Shift from 1 through intermediate ranges to desired range.

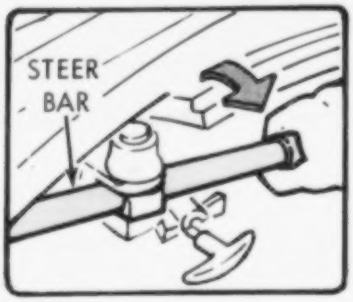


## 2-12. Operating Under Normal Conditions on Land - continued.

**CAUTION: Steer vehicle with an even steady pull on steer bar; don't jerk or you may lose control of vehicle.**



d. Turn to left (forward or reverse) by pulling on left end of steer bar.



e. Turn to right (forward or reverse) by pulling on right end of steer bar.

**CAUTION: Shift in or out of reverse only after bringing vehicle to a complete stop.**

f. You can pivot steer in 1st (low) and in both reverse shift ranges during land driving.

g. Perform during operation PMCS, if tactical situation permits (starting on page 3-5).

**CAUTION: Do not drive below the specified minimum speed for each shift range or you'll overheat the transmission (see next page).**

## 2-12. Operating Under Normal Conditions on Land - continued.

Operating Ranges

| Shift range | Minimum speed | Max speed | Ground characteristics |
|---|---|---|---|
| 1st (low) | 0 mph | 7 mph | Mud, snow, deep sand, steep grades |
| 2nd | 5 mph | 10 mph | Semihard surface, moderate slopes |
| 3rd | 8 mph | 19 mph | Hard surface, rolling terrain |
| 4th | 19 mph | 40 mph | Flat and hard surfaces |
| 1st | Reverse | 5 mph | Use as required |
| 2nd | Reverse | 9 mph | Use as required |

**CAUTION: Do not down-shift above the specified maximum safe down-shift speed range or you'll damage the transmission.**

Down-Shift Guide

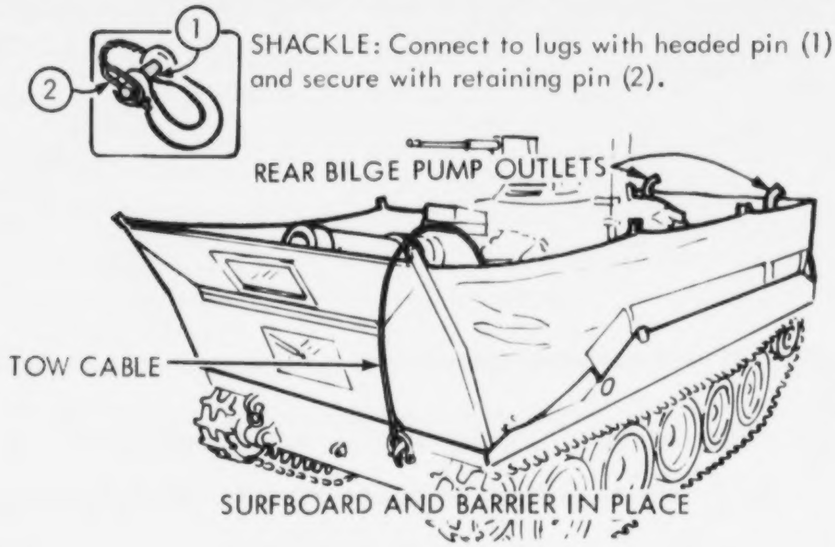
| Shift ranges | Maximum safe speeds |
|---|---|
| 1st to neutral | 3 mph |
| 2nd to 1st | 5 mph |
| 3rd to 2nd | 10 mph |
| 4th to 3rd | 19 mph |
| 1st reverse to neutral | 2 mph |
| 2nd reverse to 1st reverse | 5 mph |

## 2-13. Operation Under Normal Conditions in Water (Swimming).

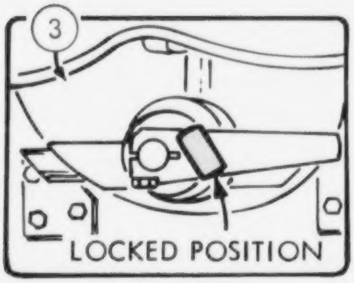
a. Pre-Operation Checks and Services. Perform before - operation PMCS (starting on page 3-5).

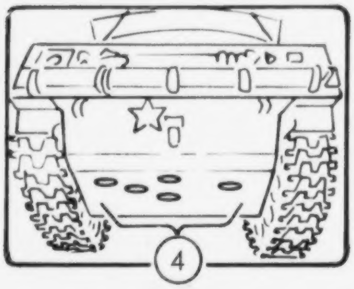
2-13. Operation Under Normal Conditions in Water (Swimming) - continued.

CAUTION: When vehicle is combat loaded, the equipment must be correctly stowed for proper balance in water. Attach tow cable to front or rear towing shackle before entering water to be ready for emergency towing. Don't let center portion of cable drag in water.


1
2
REAR BILGE PUMP OUTLETS
TOW CABLE
SURFBOARD AND BARRIER IN PLACE

SHACKLE: Connect to lugs with headed pin (1) and secure with retaining pin (2).


3
LOCKED POSITION

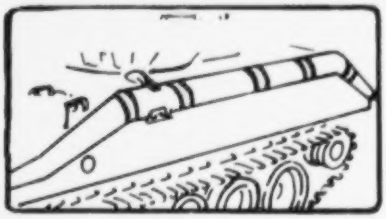


WARNING: Be sure driver's escape hatch (3) and five drain/access plugs (4) on hull bottom are secured.

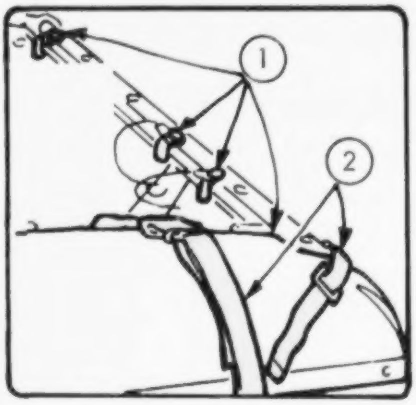
NOTE: Check searchlight according to instructions in paragraph 2-74a. on page 2-178.

## 2-13. Operation Under Normal Conditions in Water (Swimming) - continued.

b. Erecting and Securing the Surfboard and Barrier.



1. Release retaining straps from left and right barrier covers.



2. Pull out eight locking pins (1) securing side rear slope plate and rear barrier covers.

3. Pull side barrier covers from stowed position and barrier from barrier tray.

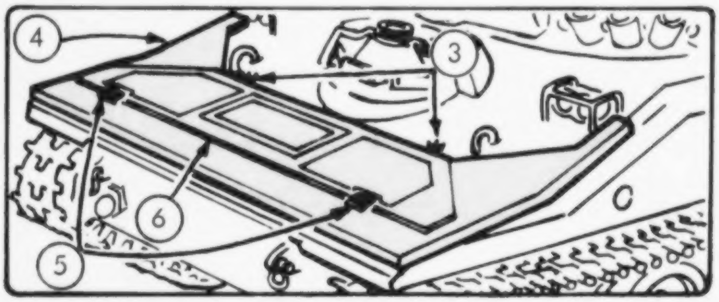
4. Pull barrier from barrier tray.

5. Unbuckle rear cover straps (2) and pull barrier cover away.

**NOTE: Now the crew must get up on vehicle (two in front and two in rear) to erect barrier correctly.**

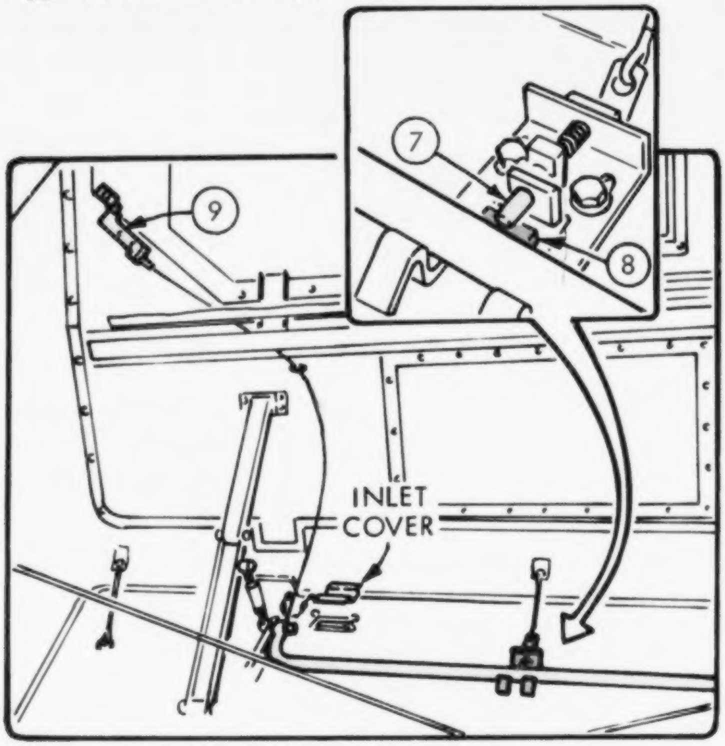
6. Loosen wing nuts (3) and rotate locking screws on surfboard (4).

7. Loosen wing nuts (5) on surfboard extension (6).



## 2-13. Operation Under Normal Conditions in Water (Swimming) - continued.

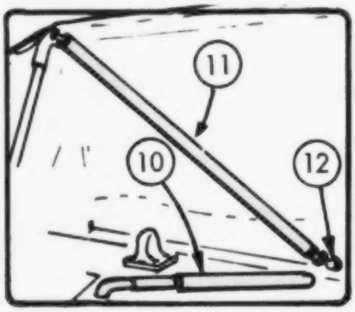
8. Raise surfboard and engage release bracket trigger (7) over handle stop (8).



9. Raise surfboard extension and secure by engaging two latches (9). Remove inlet covers.

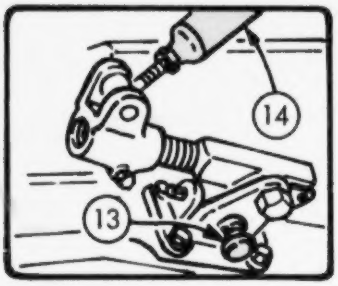
10. Remove two rear bilge pump outlet hoses (10) from diagonal supports (11).

11. Place the two diagonal supports (11) into sockets (12). Make sure the supports are seated.



## 2-13. Operation Under Normal Conditions in Water (Swimming) - continued.

12. Secure rear left barrier support by pulling out on plunger (13) and rotating support arm (14) into extended position until plunger snaps in and locks.

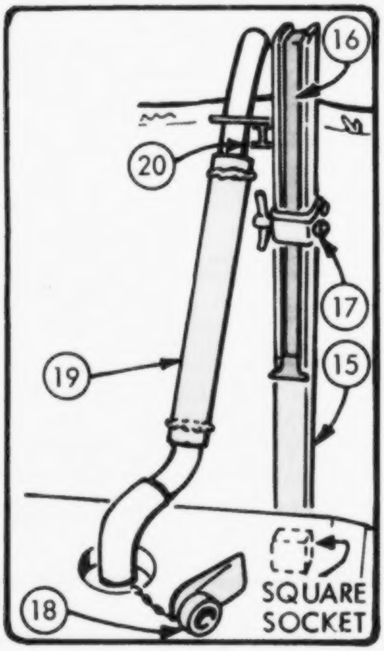


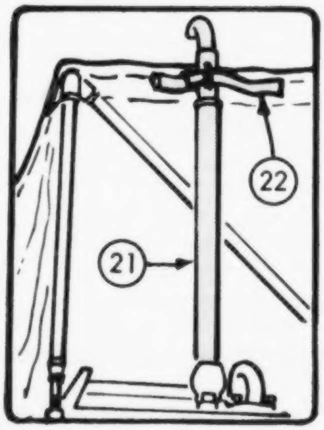
13. Each crew member inserts one barrier side post (15) into square sockets provided in barrier trays.

14. Place straps (16) over top of post (15) and pull down thru strap lock (17) to raise side barriers. Install hoses to bilge pump outlets.

15. Remove water deflector (18) from front bilge pump outlet.

16. Attach end of hose (19) to post (15) with pin (20), and insert other end into outlet.

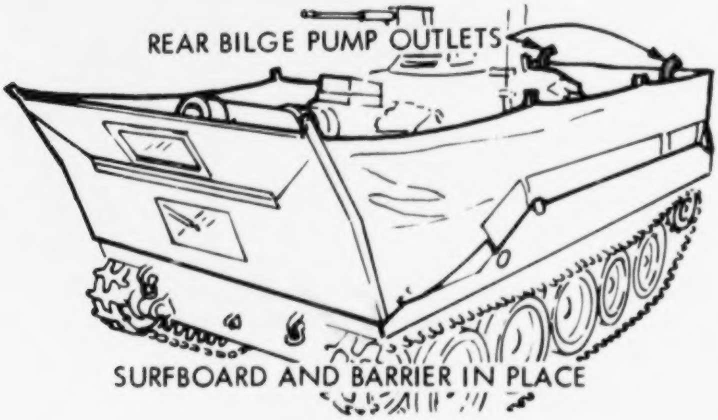




17. Insert rear bilge pump outlet hoses (21) and strap (22) to rear barrier.

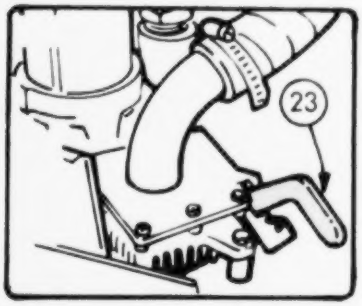
18. Make certain drain holes in rear barrier tray are clear of debris.

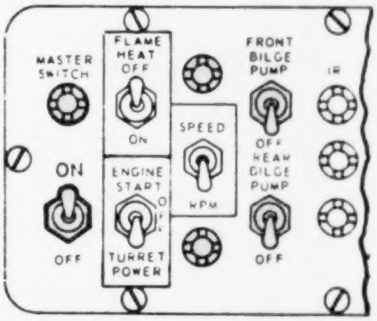
## 2-13. Operation Under Normal Conditions in Water (Swimming) - continued.


REAR BILGE PUMP OUTLETS
SURFBOARD AND BARRIER IN PLACE

19. Check bilge pump operation by adjusting front bilge pump lever (23) as required (up - evacuates surfboard cavity only - down - evacuates crew area only).

**NOTE: Reverse procedure for vehicles serial numbered 1 through 139.**




MASTER SWITCH
ON
OFF
FLAME HEAT OFF
ON
ENGINE START
OFF
TURRET POWER
SPEED
RPM
FRONT BILGE PUMP
OFF
REAR BILGE PUMP
OFF
IR

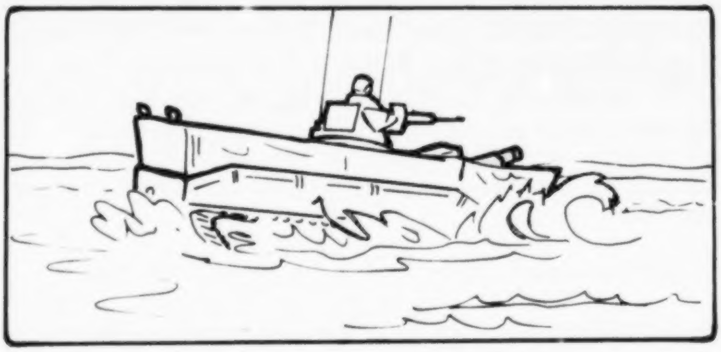
20. Turn MASTER SWITCH and BILGE PUMP switches on. Listen and make sure bilge pumps are working properly. If hull is dry, place hand over outlets to be sure air is being expelled.

**CAUTION: Do not operate pumps more than 15 minutes without engine running.**

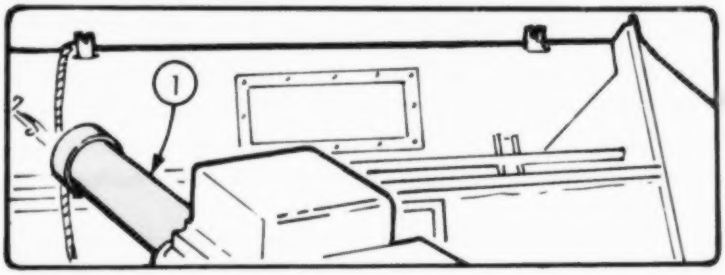
21. Turn BILGE PUMP switches to OFF and start engine.

## 2-13. Operation Under Normal Conditions in Water (Swimming) - continued.

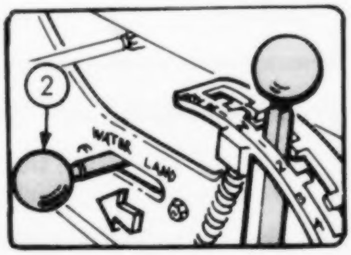
c. Entering Water with Vehicle



**WARNING: So driver will have clearance if he has to evacuate vehicle, elevate gun (1) to about 90 mils and traverse to left of driver's hatch before entering water.**



1. Push WATER/LAND steer shift control lever (2) forward to WATER position.
2. Shift into 1st.



## 2-13. Operating Under Normal Conditions in Water (Swimming) - continued.

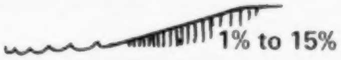
### WATER ENTRY PRECAUTIONS

Select a gradual sloping bank of firm ground that is free of rocks, stumps, or debris to enter water. Avoid drop-offs into water, soft ground, or steep grades where vehicle may lose traction, bog down, or skid.

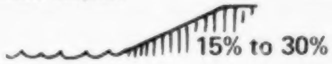
Leave vehicle hatch covers open while entering water and during amphibious operation.

If vehicle must be towed in water, do not exceed 5 mph.

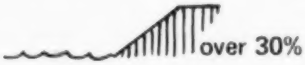
10 mph is maximum safe water entry speed from gradual slopes:



5 mph is maximum entry speed from medium slopes:



Ease vehicle into water from steeper slopes. The vehicle front will become buoyant before entry is completed.



Avoid entering at steep slopes if at all possible. High speed entries from slopes can cause failure of flotation components and, possibly, injury to the crew. You could swamp the vehicle.

3. Drive vehicle carefully into water.

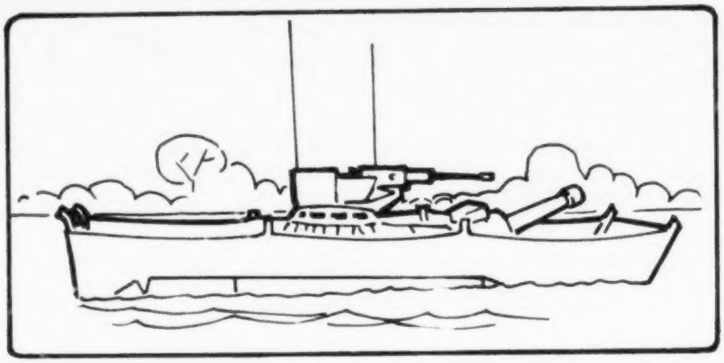
WARNING: If a solid stream of water continues to flow from bilge pump outlets, get your vehicle back on land and determine cause of leakage.

WARNING: If engine stops and cannot be restarted immediately, prepare to evacuate in case vehicle starts sinking.

## 2-13. Operating Under Normal Conditions in Water (Swimming) - continued.

4. Immediately upon entering water, turn BILGE PUMP switches on and shift into 3rd range for best performance.

d. Driving in Water. When turning vehicle, return steer bar to center position before turn is completed. Momentum of vehicle will complete turn. To get maximum turning response, let up on accelerator pedal, turn steering bar, then accelerate.



**NOTE: Propulsion and steering are same on water and land.**

e. Stopping in Water.

1. Release accelerator pedal and apply brake to stop tracks.

2. Shift to R2 (reverse). Release brake and gently accelerate.

**NOTE: When traveling in reverse, vehicle is stopped the same way, except shift lever is moved to 1st.**

3. Release accelerator pedal when forward motion is stopped; shift to N.

f. Leaving Water.

1. Approach bank squarely, and ease up on accelerator to reduce track speed allowing vehicle to coast until tracks contact solid ground.

2. Return WATER/LAND steer shift control lever to LAND position and proceed to land in 1st.

**CAUTION: Leave water on hard ground, free of obstacles. Avoid soft banks or steep slopes where vehicle may bog down or stall.**

## 2-13. Operation Under Normal Conditions in Water (Swimming) - continued.

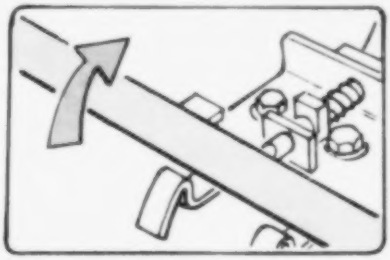
**CAUTION: If vehicle has been submerged, notify supporting maintenance to retrieve it. After it is back on land, remove hull access plugs and driver's escape hatch. Immediately, before any further operation, notify organizational maintenance for servicing.**

3. Stop vehicle when clear of water and on firm footing. Clear tracks and wheels of any debris.

4. Turn bilge pumps off when all possible water has been removed from vehicle. Stop engine. If there is still water on the floor, loosen driver's escape hatch sufficiently to break seal and allow water to drain.

5. Retract surfboard and barrier by reversing procedures (paragraph 2-13, b., steps (2) through (17) (starting on page 2-25).

**WARNING: Immediately move your hands clear when retracting surfboard.**

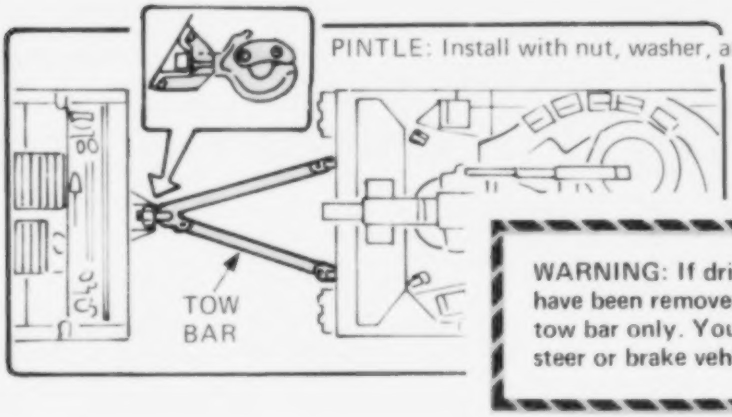


6. Inspect suspension components and any other component which may have gotten wet. Service according to lubrication chart L09-2350-230-12.

## 2-14. Towing a Disabled Vehicle On Land.

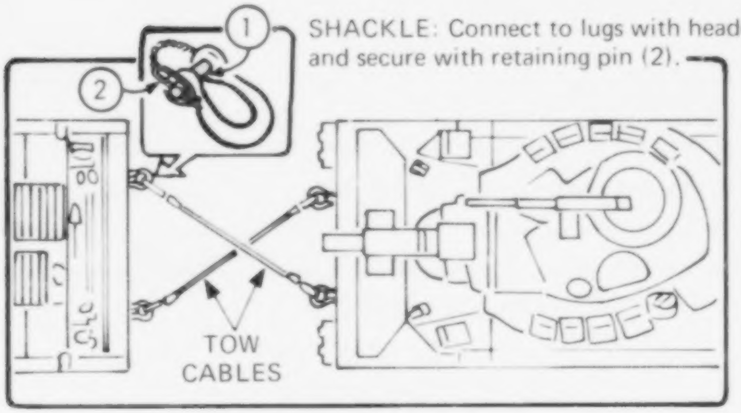
**NOTE: If vehicle is to be towed more than 1/4-mile or if sprocket drive shafts or transmission are damaged, notify organizational maintenance.**

## 2-14. Towing a Disabled Vehicle On Land - continued.



PINTLE: Install with nut, washer, and cotter pin.

**WARNING: If drive shafts have been removed, use tow bar only. You can't steer or brake vehicle.**



SHACKLE: Connect to lugs with headed pin (1) and secure with retaining pin (2).

a. Connect tow bar or tow cables.

b. Shift to N.

c. Release brake and signal towing vehicle.

d. Start towing operation slowly and smoothly.

**NOTE: In an emergency, vehicle may be towed in forward or reverse for 1/4-mile at no more than 5 mph.**

## 2-15. Towing Vehicle to Manually Start Engine.

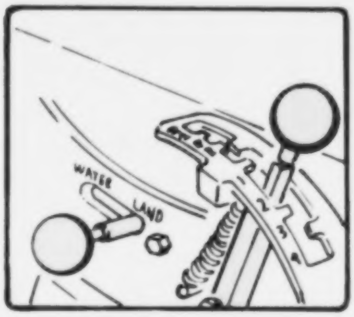
a. Connect tow bar or tow cables (as described in paragraph 2-14 page 2-33).

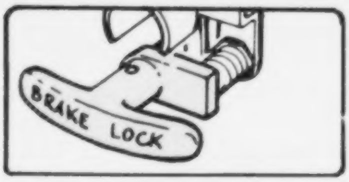
b. Shift into 2nd.

c. Turn vehicle MASTER SWITCH on.

d. Place WATER/LAND steer shift control lever to LAND.

e. Depress brake pedal and release parking BRAKE LOCK. Release BRAKE PEDAL.





**WARNING: Never attempt turns at speeds over 5 mph and never depress accelerator pedal on towed vehicle.**

f. Tow vehicle in a straight line 6 to 19 mph to start engine.

g. After engine starts, stop vehicle, shift to N, and adjust hand throttle control knob to run engine at 1000 to 1300 rpm.

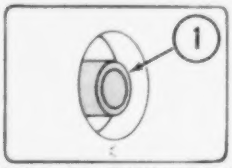
h. Disconnect towing vehicle.

## 2-16. Slave Start of Engine.

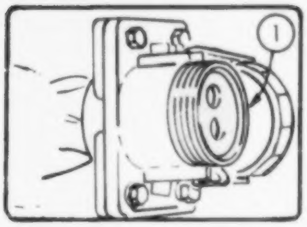
**WARNING: Do not allow personnel between vehicles during slave start operation.**

**2-16. Slave Start of Engine - continued.**

a. Connect slave cable to stalled vehicle's auxiliary power receptacle (1) and to another vehicle or other power source.



NATO CONFIGURATION



OLD CONFIGURATION

CAUTION: Polarity and voltage (24V) must be identical in both vehicles.

CAUTION: Be sure vehicle MASTER SWITCH is at OFF in stalled vehicle. All accessories must be off.

b. Shift to N and set parking brake.

c. Start engine of starting vehicle or power source and adjust throttle

**NOTE: When using another M551 vehicle for slave starting source, adjust throttle control knob until tachometer reads 1300 to 1500 rpm before cranking stalled vehicle. Do not speed up engine during slave start. Engine speed will decrease and battery-generator indicator will normally drop into yellow or red band during slave starting.**

d. Press stalled vehicle ENGINE STARTER switch.

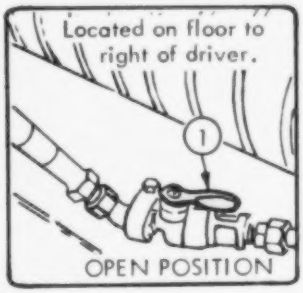
e. When stalled engine starts, increase engine rpm in starting vehicle.

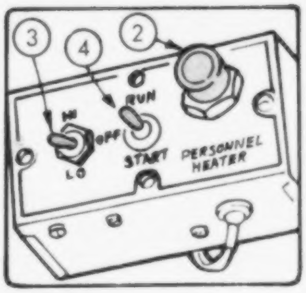
f. Disconnect slave cable and quickly turn on MASTER SWITCH in vehicle being started.

**2-17. Personnel Heater Operation.**

**NOTE: Heater operates with MASTER SWITCH set to ON or OFF.**

### 2-17. Personnel Heater Operation - continued.


Located on floor to right of driver.
1
OPEN POSITION


3
4
2
HI
OFF
LO
RUN
START
PERSONNEL HEATER

a. Make sure fuel supply valve (1) is open before starting heater.

b. Depress personnel heater light (2) to check lamp. If lamp does not light, replace it. If new lamp doesn't light, notify organizational maintenance.

c. Place heat selector switch (3) to HI or LO.

d. Hold heater control switch (4) at START for 2 minutes (longer in extreme cold) until indicator lamp lights.

e. Place RUN/START control switch (4) to RUN.

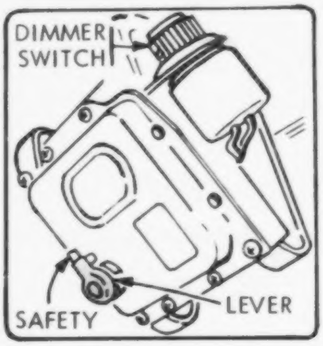
f. To stop heater, set heater selector switch to OFF. Indicator shall stay on and blower run for 2 or 3 minutes until combustion chamber is purged.

g. After blower stops, turn MASTER SWITCH to OFF.

### 2-18. Operation of Lights.

a. Dome Light Control.

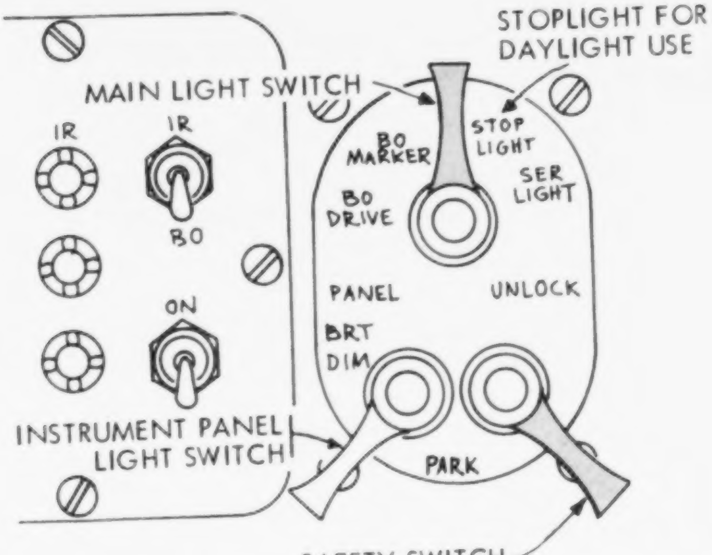
1. Red light on. Turn lever fully clockwise.
2. White light on. Press safety latch and turn lever counterclockwise past stop.
3. Both lights off. Turn lever counterclockwise against stop.


DIMMER SWITCH
SAFETY
LEVER

## 2-18. Operation of Lights - continued.

b. Driving Lights.

1. Driving lights are controlled by the following switches.


STOPLIGHT FOR DAYLIGHT USE
MAIN LIGHT SWITCH
IR
IR
BO
ON
BO MARKER
STOP LIGHT
SER LIGHT
BO DRIVE
PANEL
UNLOCK
BRT
DIM
INSTRUMENT PANEL LIGHT SWITCH
PARK
SAFETY SWITCH

Push up to unlock main light switch.
Release after main light switch is in position.

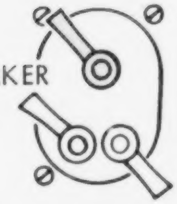
## 2-18. Operation of Lights - continued.

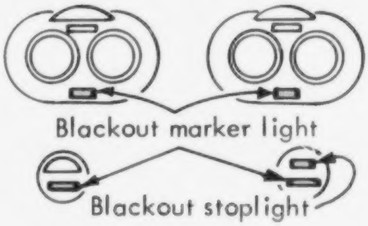
2. Switch settings and resulting driving light illumination are:

Switch Setting

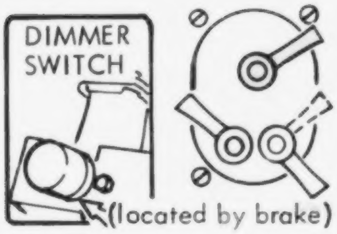
Lights Turned On

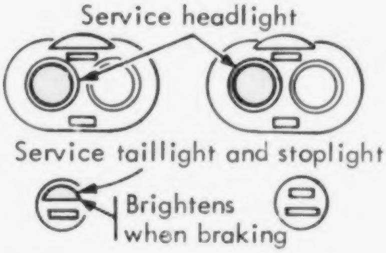
BO MARKER



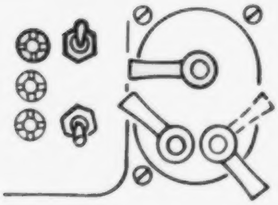

Blackout marker light
Blackout stoplight

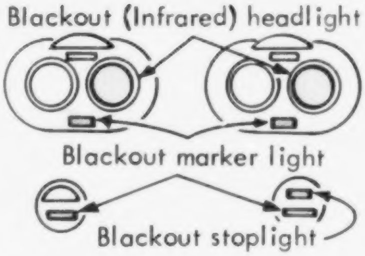
SER LIGHT


DIMMER SWITCH
(located by brake)

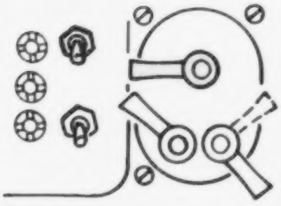

Service headlight
Service taillight and stoplight
Brightens when braking

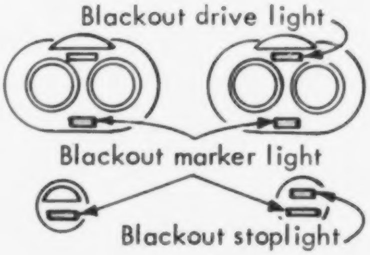
BO DRIVE (IR)




Blackout (Infrared) headlight
Blackout marker light
Blackout stoplight

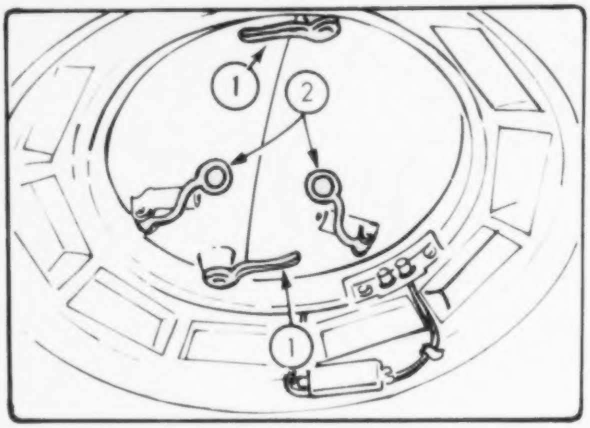
BO DRIVE




Blackout drive light
Blackout marker light
Blackout stoplight

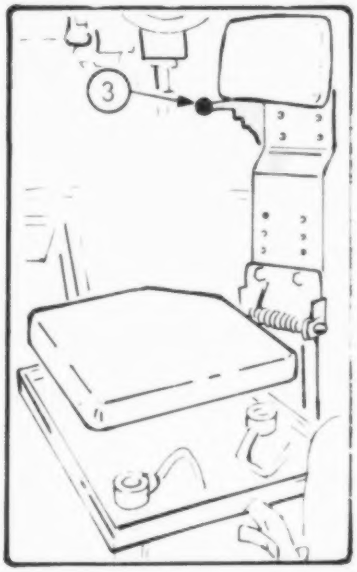
# Section II. TURRET AND CUPOLA OPERATING PROCEDURES

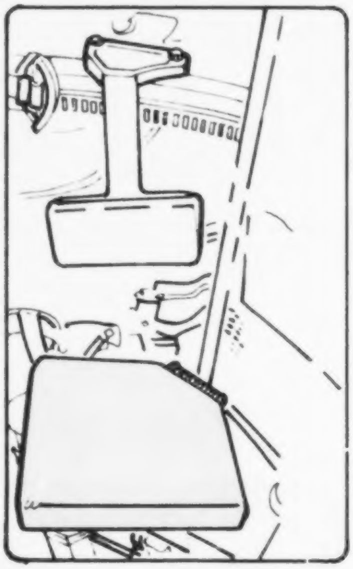
## 2-19. Operating Turret Controls and Seats.



a. Commander's Split Hatch Door. To open commander's split latch doors, turn two locking levers (1), pull down on release levers (2), and push open.

b. Commander's Seat. To adjust height of commander's seat, sit on the seat and pull up on lever (3). When you get the seat where you want it, release lever.

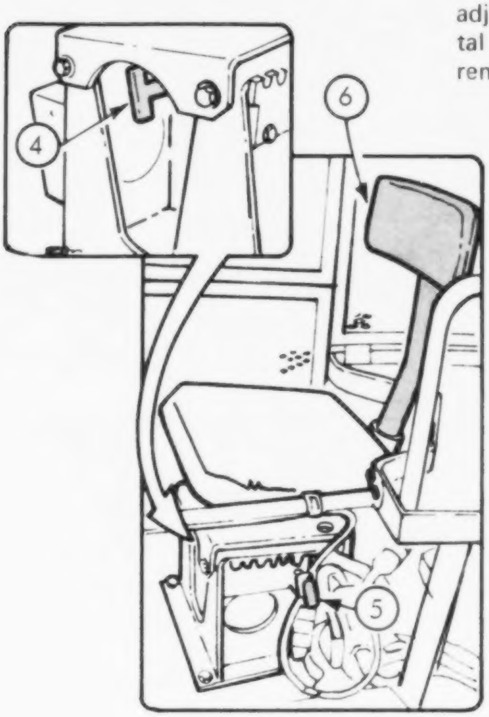


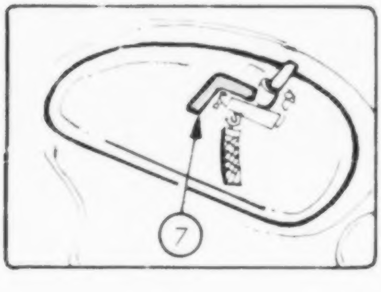


c. Loader's Seat. The seat is spring loaded. Pull down to sit.

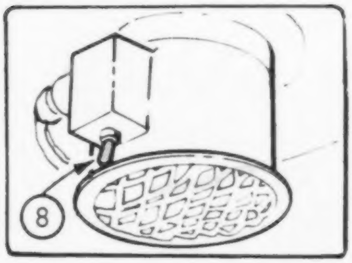
## 2-19. Operating Turret Controls and Seats - continued.

d. Gunner's Seat. Adjust gunner's seat up or down with vertical adjustment handle (4); adjust forward or backward with horizontal adjustment handle (5). Back rest (6) is removable.





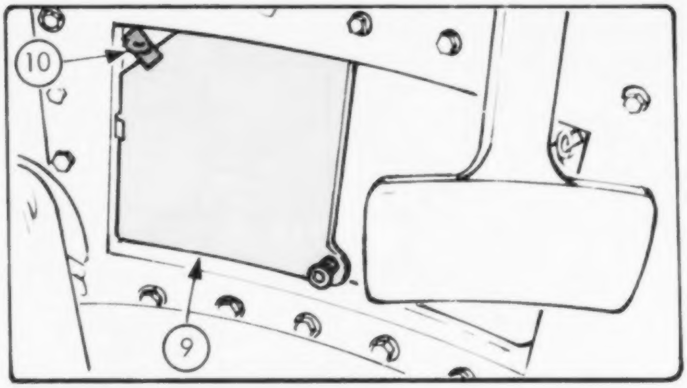
e. Loader's Hatch Cover. Open loader's hatch by pulling out locking lever (7), and pushing up on cover.



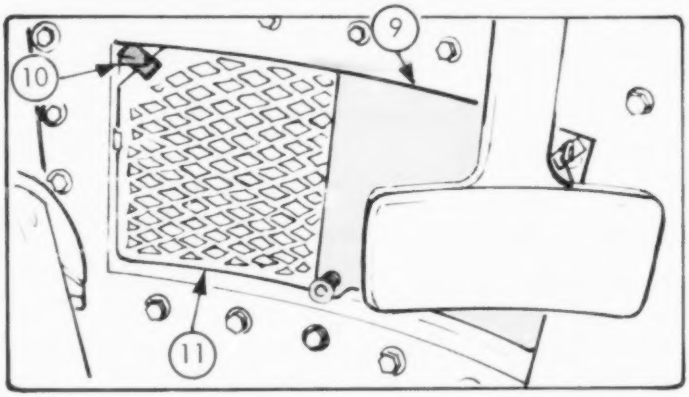
f. Turret Ventilating Fan. Ventilates the turret. When firing, turn on fan with switch (8).

## 2-19. Operating Turret Controls and Seats - continued.

g. Turret Bulkhead Opening.



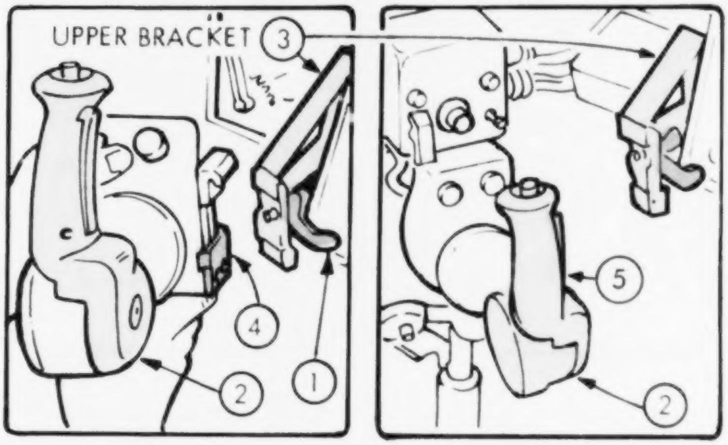
1. For cold weather operation, pivot solid panel (9) over the opening and lock with latch (10).



2. For increased ventilation, pivot solid panel (9) back and leave grille panel (11) over opening. Lock with latch (10).

## 2-20. Dual - Position Mounting of Commander's Control Handle.

a. Operation. Operate commander's control handle from upper bracket while standing. When seated, move control handle to lower bracket.



b. Removal

1. Raise locking lever (1) against stop to release control handle (2).
2. Remove handle (2) from upper bracket (3).

c. Installation

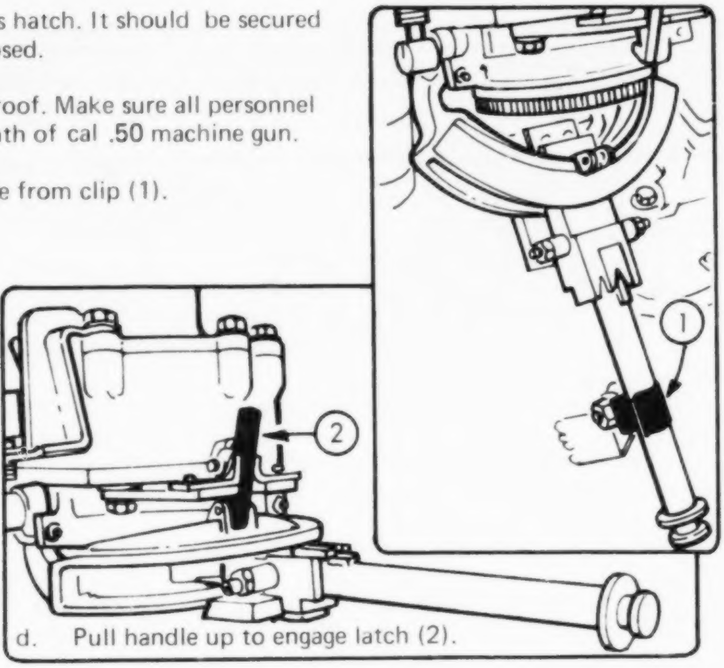
1. Raise locking lever (1) against stop.
2. Hook block (4) over mounting plate on bracket (3).
3. Push lever (1) down to lock control handle in place on lower bracket (5).

## 2-21. Manually Traversing Cupola (M551).

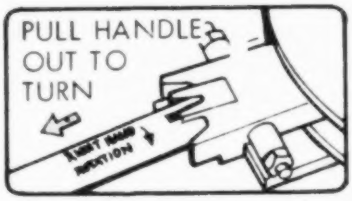
a. Check loader's hatch. It should be secured opened or closed.

b. Check turret roof. Make sure all personnel are clear of path of cal .50 machine gun.

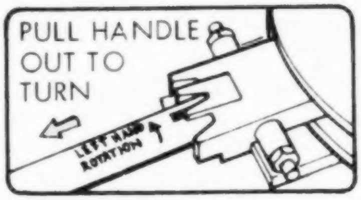
c. Release handle from clip (1).



d. Pull handle up to engage latch (2).

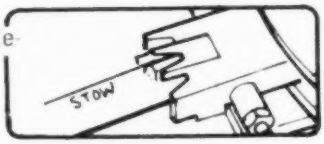

PULL HANDLE OUT TO TURN
RIGHT HAND ROTATION

e. To traverse right, turn to RIGHT HAND ROTATION; then move ratchet handle to right.

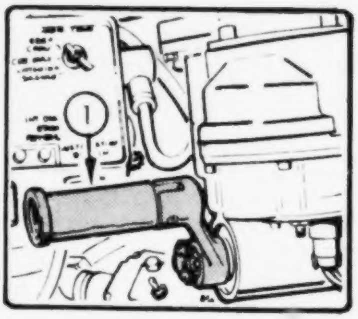

PULL HANDLE OUT TO TURN
LEFT HAND ROTATION

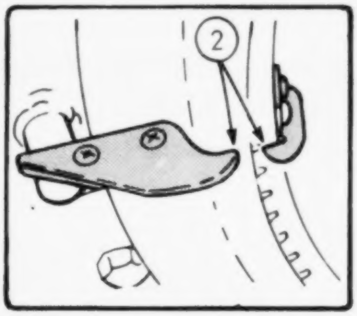
f. To traverse left, turn to LEFT HAND ROTATION; then move ratchet handle to left.

g. To stow, pull out on handle and turn to STOW. Release handle from latch and snap into clip.



## 2-22. Manually Traversing Cupola (M551A1).





a. Check loader's hatch . . . it should be secured.

b. Check turret roof . . . make sure all personnel are clear of path of cal .50 machine gun.

c. Push down handle (1) to operating position.

d. Turn handle (1) to traverse right or left. To aline the laser range finder (LRF) with gun/launcher, turn handle until index pointers (2) match up.

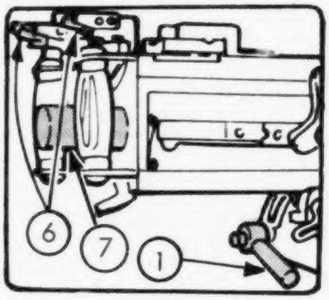
e. Finished? Replace handle to stowed position.

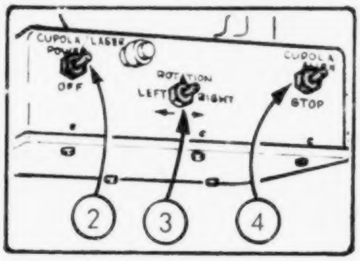
## 2-23. Electrically Traversing Cupola.

a. Tell driver to turn on MASTER SWITCH.

b. For operation inside cupola:

   1. Place machine gun in travel-lock position (1).




CUPOLA/LASER
POWER
OFF
ROTATION
LEFT
RIGHT
CUPOLA
LASER
STOP
2
3
4

   2. Push CUPOLA/LASER switch (2) to POWER.

## 2-23. Electrically Traversing Cupola - continued.

CAUTION: Maximum continuous electrical operation of cupola is 2 minutes out of every 10 minutes.

NOTE: You can also traverse cupola by pushing up on CUPOLA ALIGN switch (4) or remote switch (5). Either switch will traverse cupola until LRF is approximately aligned with gun/launcher. Pushing either of these switches down to STOP halts cupola before it's aligned. If cupola doesn't stop, perform PMCS (step 49, page 3-17).

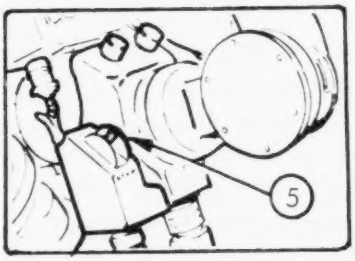
3. Push ROTATION switch (3) right or left according to desired traversing direction

NOTE: Some vehicles are equipped with left and right control buttons instead of switches.

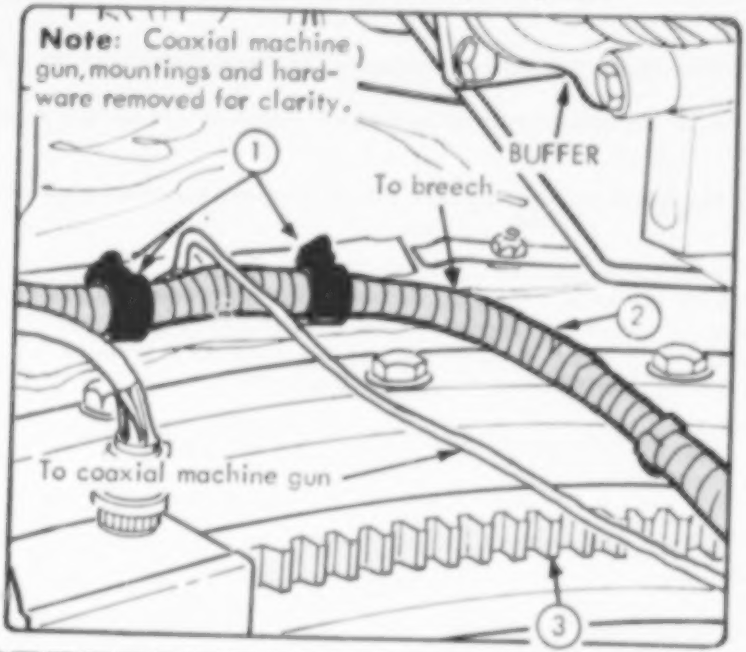
c. For operation outside cupola:

1. Traverse left by holding left switch (6) up and releasing it at desired cupola alignment.

2. Traverse right by holding right switch (7) up and releasing it at desired cupola alignment.



## 2-24. Before Traversing Turret and Elevating/Depressing Gun.



**Note:** Coaxial machine gun, mountings and hardware removed for clarity.

WARNING: Clamps (1) must be secure and located on J5 breech wiring harness (2) exactly as shown. If not, elevating/depressing and traversing could cause wear of harness against outer ring gear (3) . . . AND, if wear causes short you could get a premature fire.

While elevating/depressing and traversing, check J5 wiring harness (2) for:

a. Harness is not overstressed; clamps (1) remain secure.

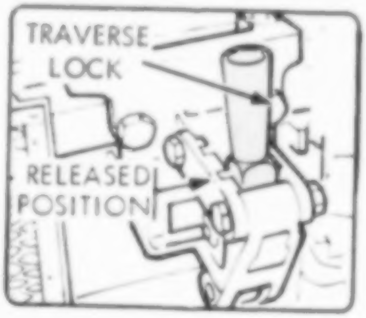
b. Harness does not contact outer ring gear (3).

## 2-25. Manually Traversing Turret and Elevating/Depressing Gun.

a. Traversing Turret.

1. Make sure all personnel are clear of turret and all grilles, access doors, and covers (in path of moving gun/launcher) are down and secured.

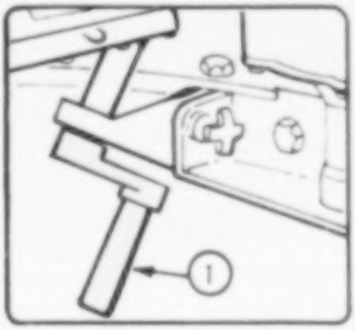
2. Push down lever and place turret traverse lock in released position.



### 2-25. Manually Traversing Turret and Elevating/Depressing Gun - continued.

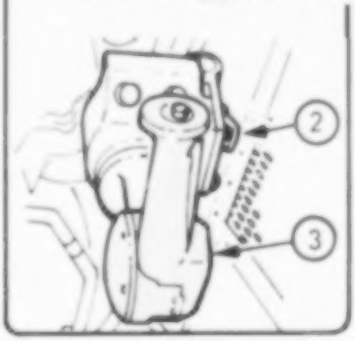
3. Traverse turret by cranking traverse handle (1).

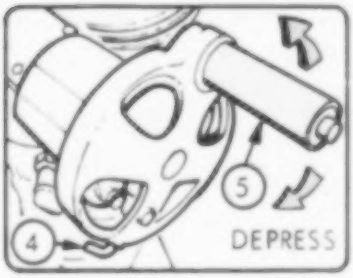
4. Finished? Lock turret with turret traverse lock. (See page 2-46).



b. Elevating/Depressing Gun/Launcher.

1. Press adjustment lever (2) and push gunner's control handle (3) down to lowered position.





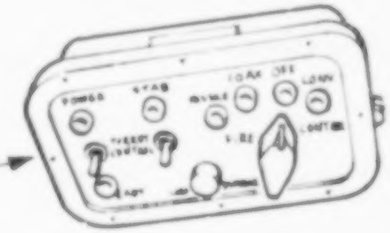
2. Pull out on locking pin (4) . . . elevate or depress gun by cranking handwheel (5).

3. Finished? Lock pin (4). Make sure pin engages in its receptacle.

### 2-26. Electrically Traversing Turret and Elevating/Depressing Gun.

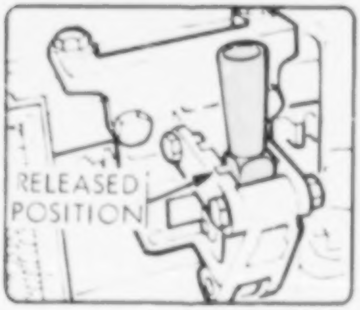
a. Make su e all personnel are clear of turret and all grilles, access doors and covers (in the path of moving gun/launcher) are down and secured.

b. Check control selector panel. Make sure TURRET CONTROL switch, STAB switch, and FIRE CONTROL selector are at OFF.

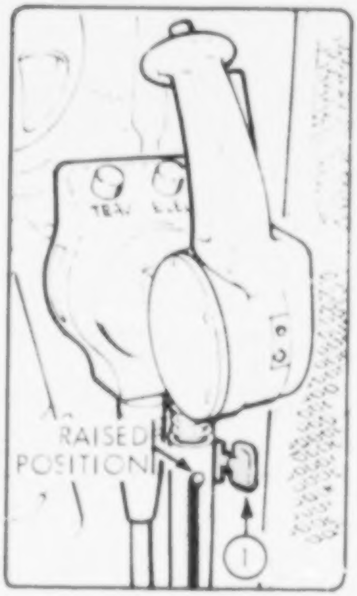


CONTROL SELECTOR PANEL

## 2-26. Electrically Traversing Turret and Elevating/Depressing Gun - continued.

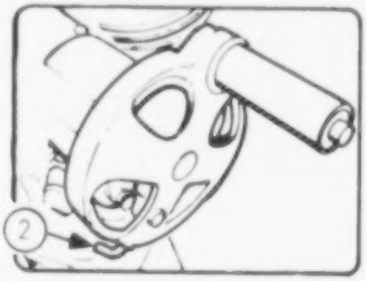


c. Release turret traverse lock. Push down and pull towards you to release the turret traverse lock.



d. If gunner's control handle is in lowered position, press lock release lever (1) and pull handle up to raised position.

e. Make sure elevation handwheel is secured with locking pin (2).

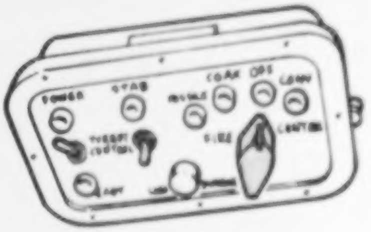


**CAUTION: Before starting engine, make sure TURRET CONTROL switch is off. If not, the initial start of engine could create a spike voltage causing damage to turret electrical components.**

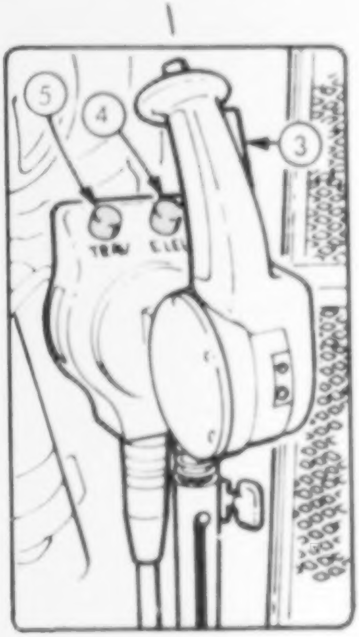
f. Tell driver to start engine. To be sure you have enough voltage, keep engine at about 1000 to 1200 rpm.

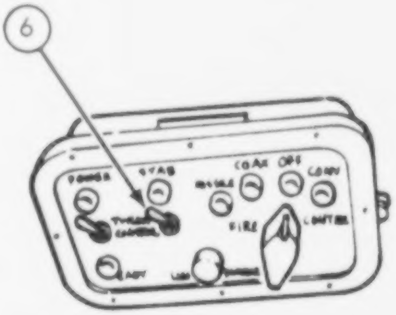
## 2-26. Electrically Traversing Turret and Elevating/Depressing Gun - continued.

g. Announce POWER, then turn TURRET CONTROL switch on. POWER lamp will light . . . wait about 20 seconds until READY lamp lights.



h. Without moving gunner's control handle, depress palm switch (3). If gun drifts up or down, trim out with ELEV button (4). If turret drifts, trim out with TRAV button (5). Now do the same at commander's control handle.





i. If stabilized mode is desired, place STAB switch (6) to on.

**NOTE: To maintain a stabilized mode, keep pressing palm switch. This, in effect, automatically provides a stable, space-oriented gun/launcher. The gunner can now aim and track the target with relative ease . . . even when vehicle is moving over rough terrain.**

CAUTION: If you elevate/depress the gun/launcher to maximum, contact limit switches will halt further movement. However, if these switches fail, gun/launcher will elevate/depress until halted by mechanical stops. If this happens, immediately stop and back off to prevent damage to servomotor and motor-generator. You'll recognize a stalled servomotor by a high pitched sound and/or burning odor from motor-generator . . . if this happens notify organizational maintenance. In the STAB mode, oscillation of the gun/launcher is normal in extreme ELEVATE/DEPRESS position.

CAUTION: When electrically traversing turret or elevating/depressing the gun, the key words are "E-A-S-Y DOES IT." To avoid damage to electrical and mechanical turret components always practice the following DO's and DON'Ts.

DO - Press palm switch before moving control handle . . . this allows motor generator to build up speed and to disengage magnetic clutches.

DO - Move control handle gently and smoothly.

DO - Accelerate speed of turret and gun evenly.

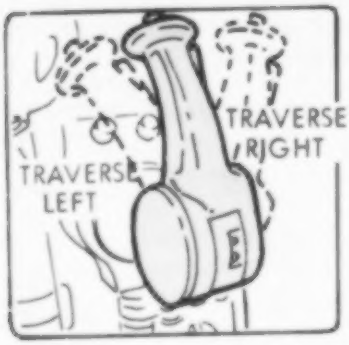
DO - Return control handle to neutral position before releasing palm switch.

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

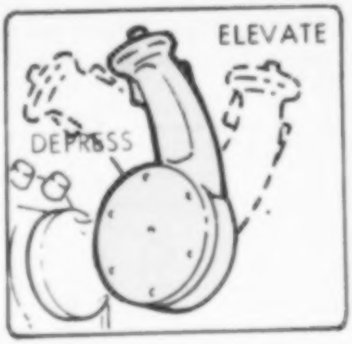
DON'T - Suddenly reverse control handle from full right to full left . . . or from full left to full right. Same goes when elevating/depressing gun.

DON'T - Suddenly release control handle allowing it to spring back to neutral.

## 2-26. Electrically Traversing Turret and Elevating/Depressing Gun - continued.


TRAVERSE RIGHT
TRAVERSE LEFT

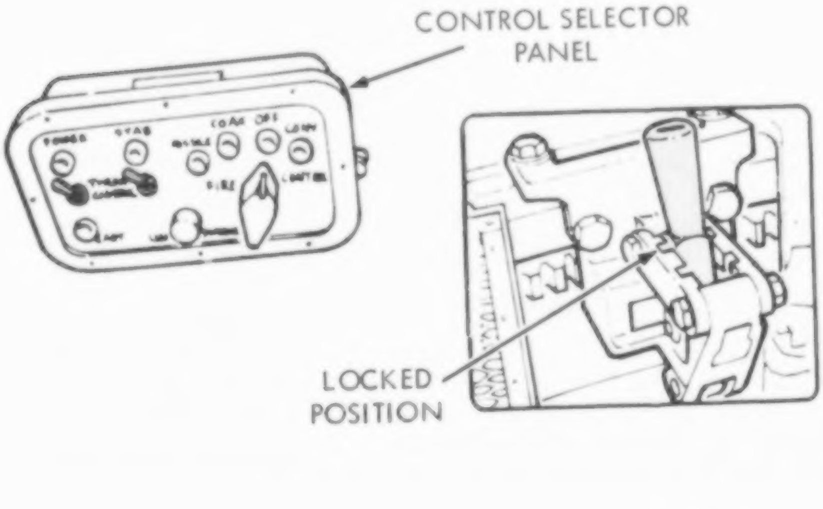
j. To traverse turret, press palm switch and push handle left (traverse left) or right (traverse right).


ELEVATE
DEPRESS

k. To elevate/depress gun, press palm switch and push handle forward (depress) or pull backward (elevate).

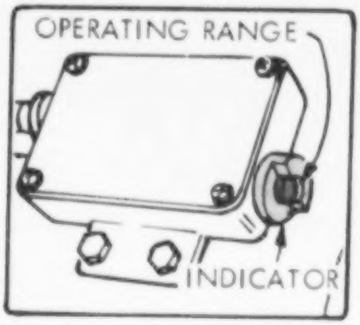
**NOTE: Commander can take charge and override gunner by pressing his palm switch. He can elevate/depress, traverse, and fire gun in either non-stab or STAB mode.**

l. Finished? Turn STAB and POWER switches to OFF and lock turret traverse lock.

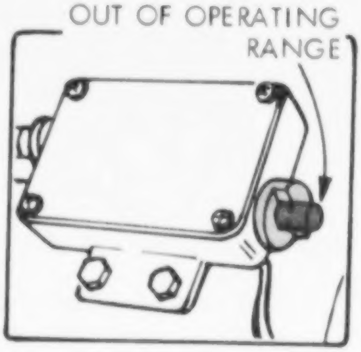

CONTROL SELECTOR PANEL
POWER
STAB
COAX
OFF
LOCKED POSITION

## 2-27. Maintaining Recoil Hydraulic Pressure and Fluid Level.

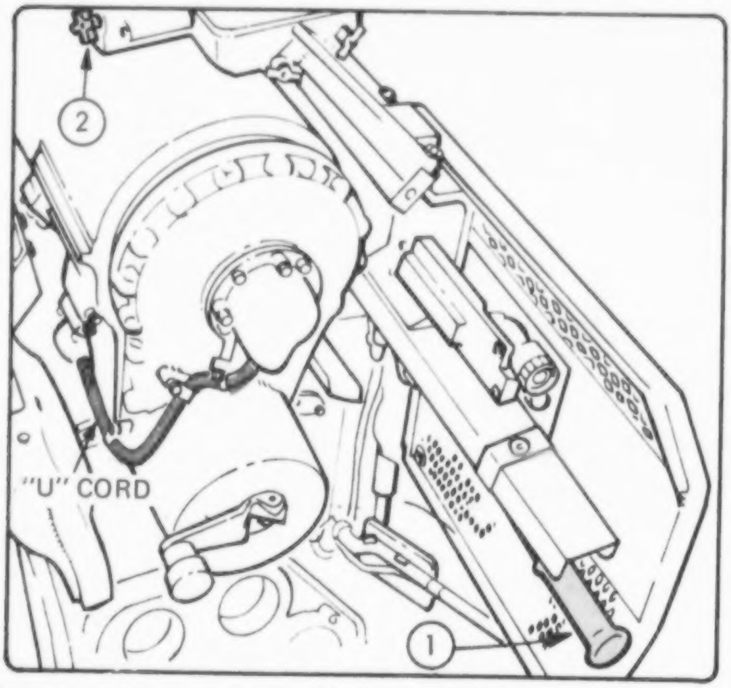
**NOTE:** Maintaining correct pressure and fluid level will give you the needed cushioning effect for the gun's recoil. Always check the pressure before adding or draining the hydraulic fluid.



a. Indicator rod in operating range. Be sure pump handle (1) is secured with strap.



b. Indicator rod out too far because pressure is too low; pump replenisher handle (1) until rod goes back to operating range.



**NOTE:** An automatic relief and bypass valve dumps any excess pressure. Step c. is necessary only in case of malfunction.

## 2-27. Maintaining Recoil Hydraulic Pressure and Fluid Level - continued.

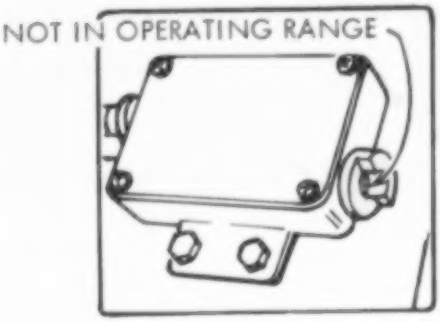
c. Indicator rod in too far.

IN COMBAT SITUATIONS:

1. Open bleed valve (2) (page 2-52) until rod comes out to operating range.

IN NON-COMBAT SITUATIONS:

2. Notify maintenance support.



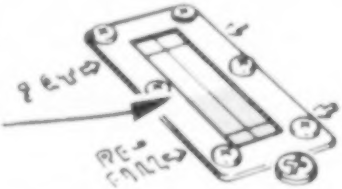
## 2-28. Checking Recoil Hydraulic Fluid Level.

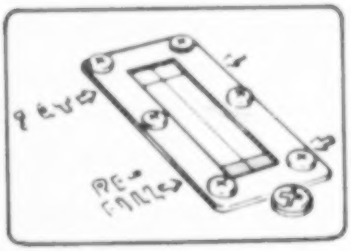
**NOTE: During firing, fluid level may rise as fluid expands from heat. If it rises to top line on gage at 265 mils elevation, drain the excess. When fluid cools, more may have to be added.**

a. Check if indicator rod is in operating range. If not, adjust pressure first (paragraph 2-27, starting on page 2-52). Any adjustments can change fluid level.

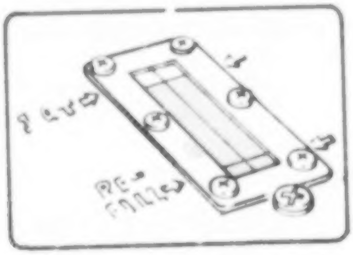
b. Elevate gun to 265 mils and check fluid level.

c. Level is acceptable when between 1 qt and refill mark.





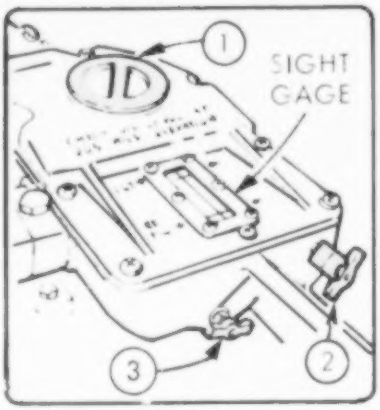
d. Level too low . . . add fluid at filter cap (1) (see next page).



e. Fluid level too high . . . drain at reservoir drain cock (2) (see next page).

## 2-28. Checking Recoil Hydraulic Fluid Level - continued.

**CAUTION: When adding fluid, don't stick spout of can through filter . . . take it easy.**

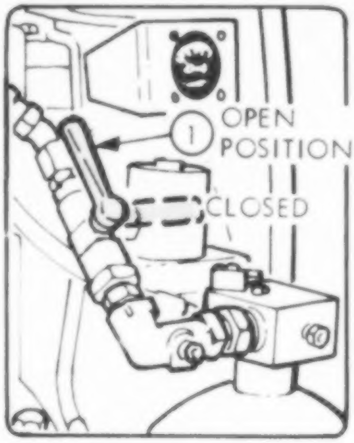

1
SIGHT GAGE
3
2

RECOIL RESERVOIR

f. Once a month, elevate gun/launcher and open condensation drain (3) to remove condensation from recoil reservoir.

## 2-29. Operation of Closed Breech Scavnging System (CBSS).

**NOTE: Check if gun/launcher is clear of ammo. Check compressor oil level prior to operation.**

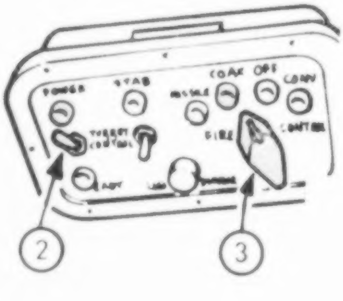

1
OPEN POSITION
CLOSED

a. Open air shutoff valve by moving handle (1) parallel with valve.

b. Tell driver to start engine and throttle to a fast idle (1000 to 1300 rpm).

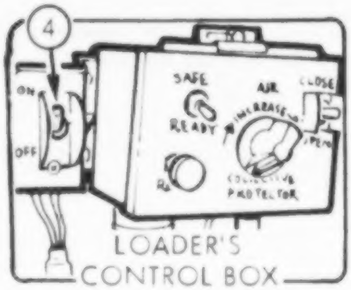
**NOTE: Your compressor will start if compressor switch is turned to ON without power at TURRET CONTROL (2). But your compressor won't start if FIRE CONTROL selector (3) is at MISSILE.**

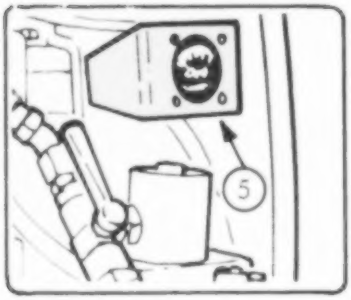
c. Check FIRE CONTROL selector (3); it can be at any one of three modes . . . at COAX, OFF, or CONV.

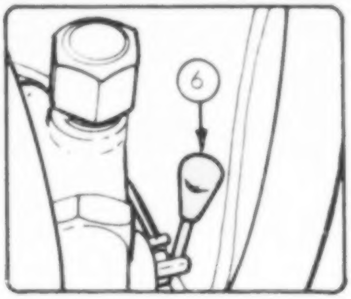

POWER
STAB
MISSILE
COAX
OFF
CONV
TURRET CONTROL
FIRE CONTROL
2
3

## 2-29. Operation of Closed Breech Scavenging System (CBSS) - continued.

d. Turn compressor switch (4) to ON. Compressor will run if pressure is less than 2800 psi and shut off when it reaches 3100 psi.







e. Keep an eye on your gage (5) until pressure is above 750 psi. With breech closed, trip manual discharge lever (6) for a second to see if everything is working. You'll know it's working if you hear a sound like a foghorn. The compressor will shut down for 10 seconds, about every 25 to 35 minutes, to dump moisture; then start up again; this is normal.

**WARNING: If scavenger system does not work, do not fire missiles or conventional ammunition on training missions until scavenging system works. Combat firings may continue at discretion of vehicle commander.**

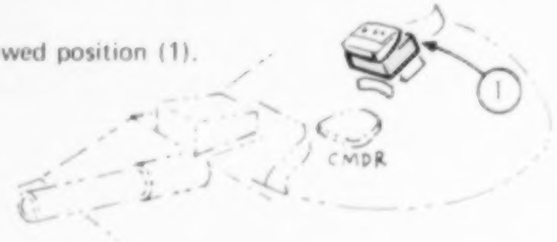
f. Check your gage before each firing. The compressor is shut off automatically when FIRE CONTROL selector is at MISSILE, and if sufficient pressure is not available before you fire a conventional round, there will be no scavenging effect.

## 2-30. Slaving Closed Breech Scavenging System (CBSS).

**NOTE: If you can't charge your CBSS with your vehicle controls, it can be charged by slaving from another vehicle. Preferably one with a full charge.**

a. Position the two vehicles close together . . . your slave hose is about 25 feet long.

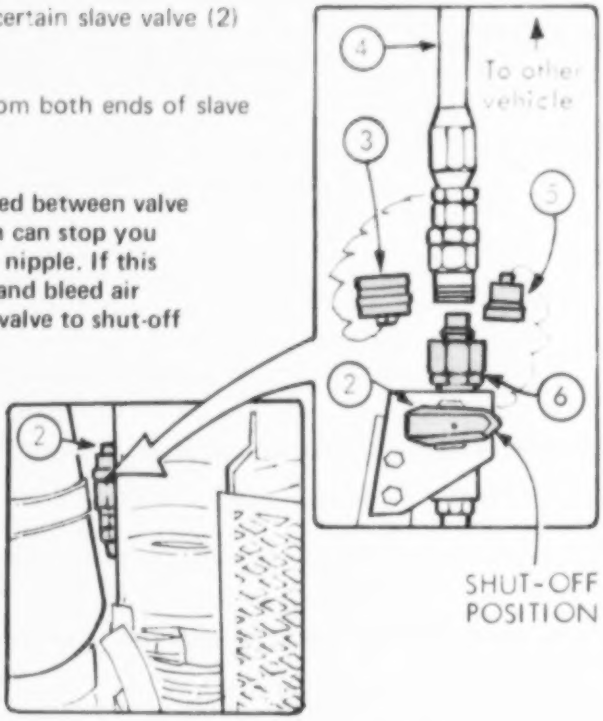
b. Remove slave hose from stowed position (1).



c. At both vehicles make certain slave valve (2) is shut off.

d. Remove dust cap (3) from both ends of slave hose (4).

**NOTE: Air maybe trapped between valve (2) and nipple (6), which can stop you from connecting hose to nipple. If this happens, open valve (2) and bleed air from system. Then turn valve to shut-off position.**



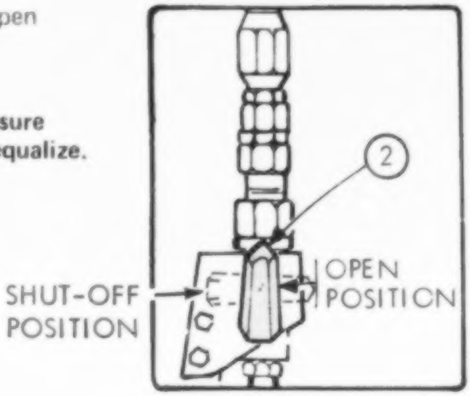
e. At both vehicles, remove dust cap (5) from valve (2).

f. At both vehicles, connect slave hose (4) to valve (2).

## 2-30. Slaving of Closed Breech Scavenging System (CBSS) - continued.

g. At both vehicles, turn valve (2) to open position.

**NOTE: With valves opened, air pressure in air bottles of both vehicles will equalize.**



h. Keep engine running in vehicle with operating compressor. Turn COMPRESSOR switch to ON (paragraph 2-29, starting on page 2-54).

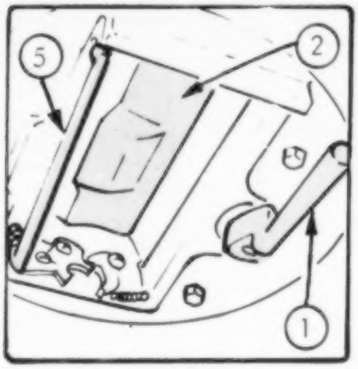
i. When air bottles of both vehicles have full charge, compressor will shut off.

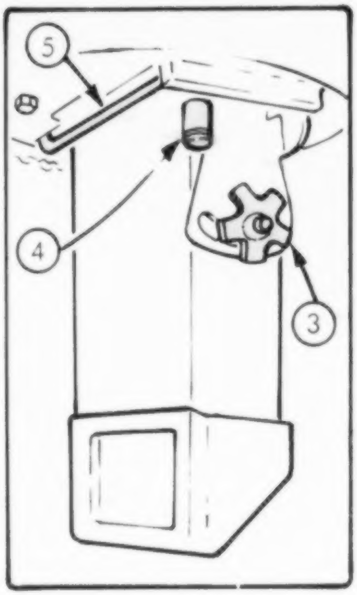
**NOTE: If deblistering of hoses is required, see page 3-120.**

j. Finished? Then turn off the compressor. Turn valve (2) to shut-off position on slaved vehicle. Bleed air from slaving vehicle.

k. Now turn valve (2) to shut-off position on slaving vehicle. Disconnect slave hose. Install dust caps (5) on slave hose and nipples (6). Stow the hose.

## 2-31. Installation and Operation of Loader's Periscope M37.

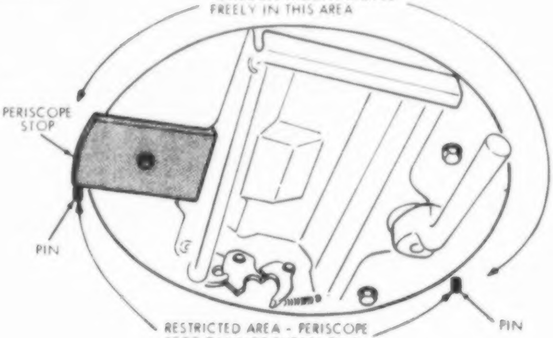




a. Installation:
   1. Turn locking lever (1) and push open door (2).
   2. Place periscope in opening and push up until it locks.
   3. Loosen knob (3) and turn adjusting screw (4) to tilt periscope for best viewing. Tighten knob (3).
   4. To scan-view, just rotate periscope by hand.

b. Removal:
   1. Hold base of periscope with one hand and release latch (5) with other hand.
   2. Stow periscope in bracket located on the side of gas-particulate filter unit M8A3.

c. Checking Loader's Periscope Stop: (M551A1 only) Rotate loader's periscope clockwise and counterclockwise.

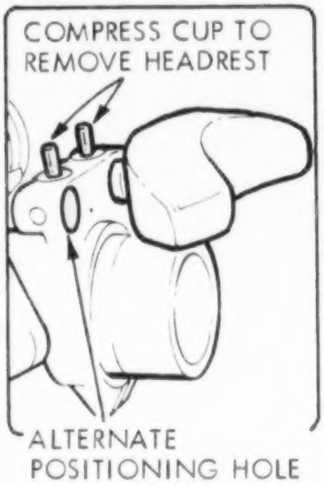

PERISCOPE MOUNT MOVES FREELY IN THIS AREA
PERISCOPE STOP
PIN
RESTRICTED AREA - PERISCOPE STOP CANNOT BYPASS PINS
PIN

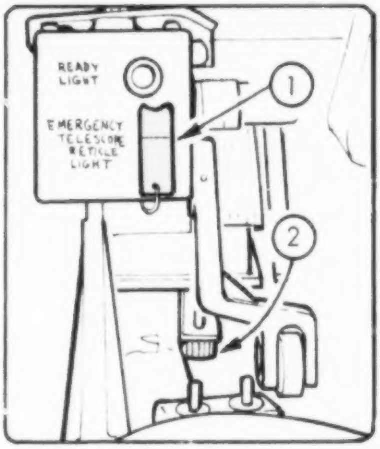
## 2-32. Operating Telescope M127 and M127A1.

a. Tell driver to turn on vehicle MASTER SWITCH. Then, turn on TURRET POWER.

b. Adjust headrest to suit your eye - if the original setting isn't OK, remove the headrest and reposition it.

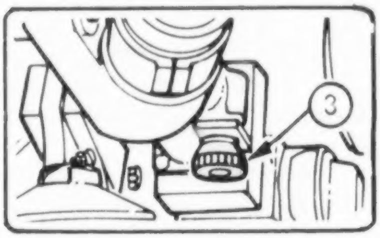
c. Turn FIRE CONTROL selector to desired firing mode . . . CONV, MISSILE, or COAX.

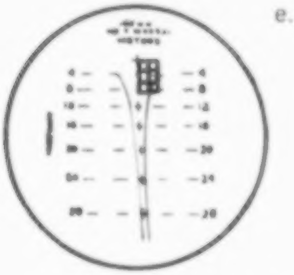

COMPRESS CUP TO REMOVE HEADREST
ALTERNATE POSITIONING HOLE


READY LIGHT
EMERGENCY TELESCOPE RETICLE LIGHT
1
2

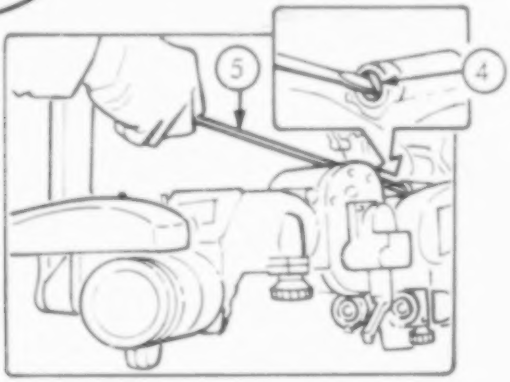
NOTE: If you've got an electrical problem, use the emergency power. Pull out on guard (1) to breake safety wire and turn on switch.

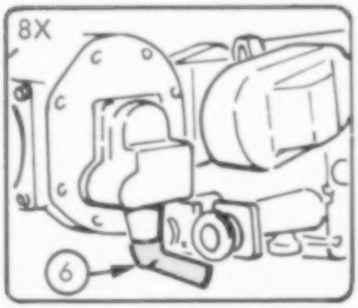
d. Look into telescope . . . adjust reticle light knob (2). Now adjust diopter knob (3) by pulling down and turning until you get the best image.

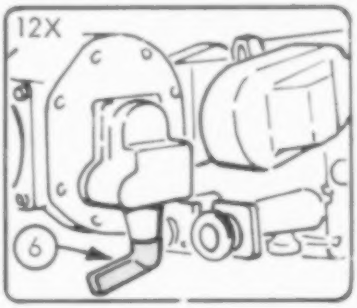




e. Look through telescope and concentrate on vertical reference line and a distant aiming point. Move your head up and down and sideways. If reticle marking on target seems to move, adjust parallax screw (4) (in or out) with long screwdriver (5) (5120-00-809-1570).



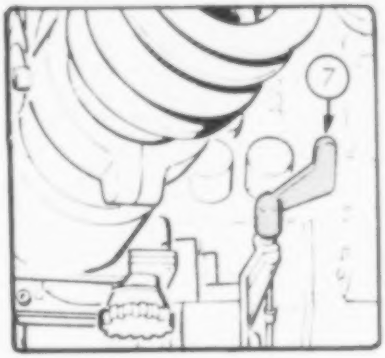




f. You can select 8 or 12-power magnification. With selector lever (6) away from you, you're at 8-power. Pull the lever toward you and you're at 12-power.

**WARNING: Before laser is fired, always place filter lever in full clockwise position . . . at this position your telescope is safety filtered. (M551A1 only). M127 does not have a laser filter.**

g. Move your filter lever (7) clockwise to a denser filter to eliminate glare.



h. If you turn FIRE CONTROL selector to another mode, you'll probably have to repeat paragraph 2-32, step d (starting on page 2-59). If you're going to boresight, refer to paragraph 2-34 (starting on page 2-67).

## 2-33. Operation of Gunner's Periscope XM44 Series.

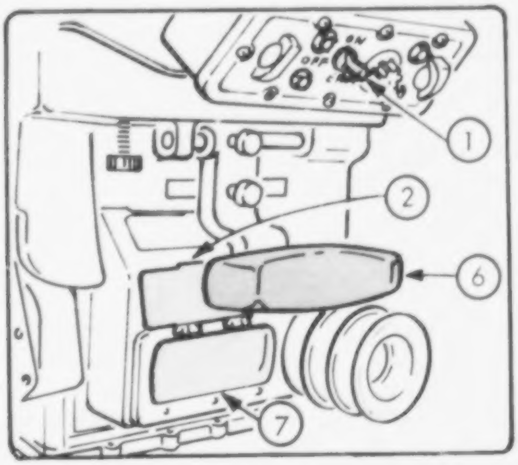
**NOTE: Your periscope may be an XM44-1 or XM44-2. References to "periscope XM44 series" represents both of these models.**

The gunner's periscope is primarily a night vision sight. However, scan-viewing through the 1-power window allows you to view surrounding terrain day or night.

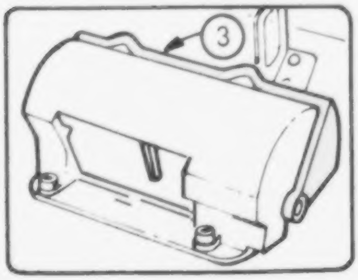
a. Day Use.

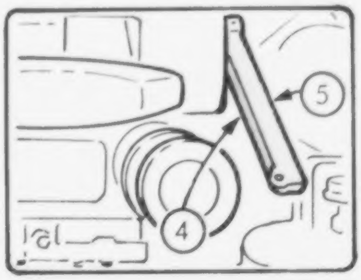
**CAUTION: Never expose periscope to direct sunlight. Be sure to place filter lever in the OFF position even though ballistic shield is closed.**

**2-33. Operation of Gunner's Periscope XM44 Series - continued.**



1. For daylight use, periscope ON/OFF/EMER switch (1) must be at OFF.
2. Open view window cover (2) (if equipped).

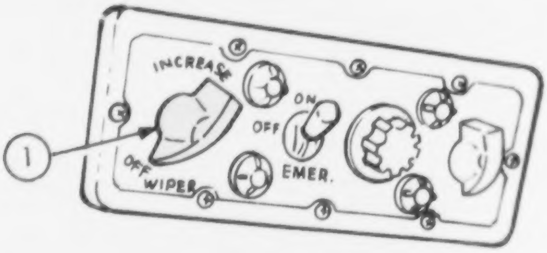




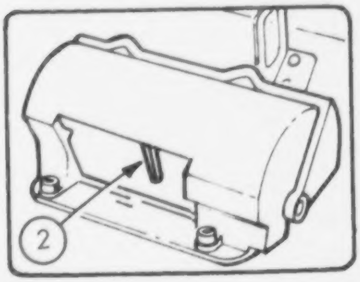
3. Open ballistic cover (3) by pressing finger latch (4) and pulling down handle (5).
4. Adjust headrest (6) to fit. Look through view window (7) and traverse turret to scan-view.

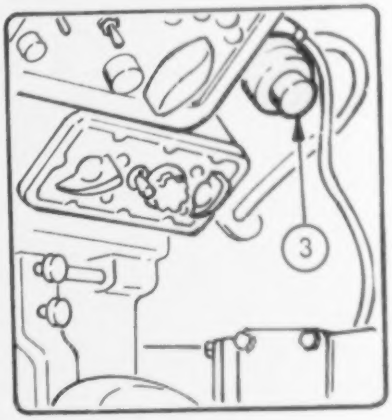
## 2-33. Operation of Gunner's Periscope XM44 Series - continued.

b. Day or Night Use.



1. If it's raining, turn the window wiper knob (1) . . . the more you turn it clockwise, the faster the wiper (2) moves.



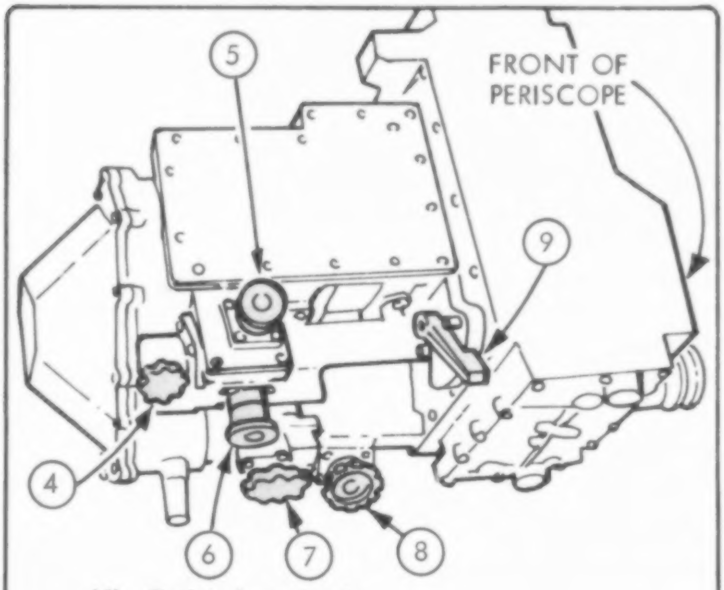


2. To clean a dirty periscope window, give it a few squirts of water by pressing washer pump button (3) and turning on the wiper. If no squirt action is noted, check fluid reservoir.

## 2-33. Operation of Gunner's Periscope XM44 Series - continued.

**NOTE: Since many of the controls are on the bottom of the periscope and some must be operated by touch, the picture below was made with the periscope out of the vehicle to help you identify the controls shown in the following steps.**

3. Get familiar with the following periscope controls:



(4) Reticle lamp knob

(5) Deflection boresight knob

(6) Elevation Boresight knob

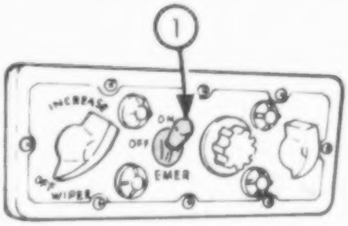
(7) Focus adjustment knob

(8) Diopter adjustment knob

(9) Filter selector lever

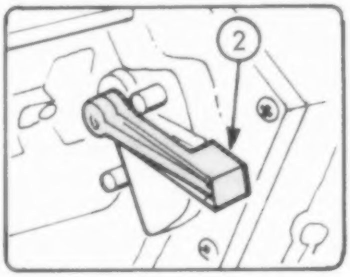
## 2-33. Operation of Gunner's Periscope XM44 Series - continued.

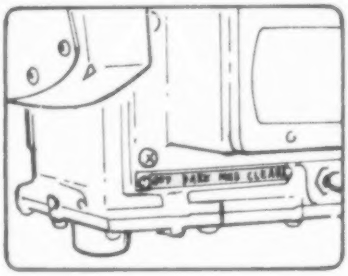
c. Night Use.



1. Turn periscope ON/OFF switch (1) to OFF; reduce turret internal lights to a minimum.

2. Tell driver to turn on MASTER SWITCH. Turn TURRET CONTROL to ON and FIRE CONTROL selector to CONV.





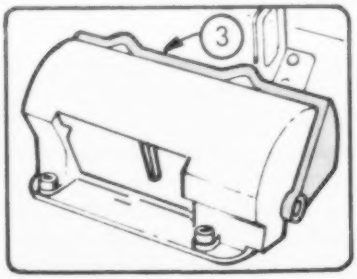
3. Place filter lever (2) to dark . . . then open ballistic cover (3) by pressing finger latch (4) and pulling down handle (5).

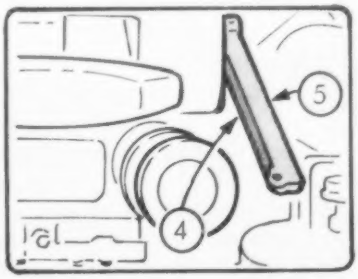
**NOTE: If your vehicle has an electrical problem, go to emergency power by pulling out switch and pushing down to EMER.**

**NOTE: If you see a brief, green flash and the image tube goes out, it means that it's too light outside. You'll have to use the telescope until it gets darker.**

4. Turn on periscope by pulling out switch (1) and pushing up to ON.

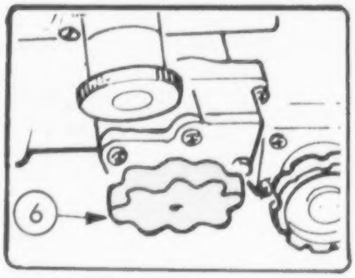
5. Look through eyepiece and adjust headrest to fit . . . now move filter lever (2) until you get the best lighting condition.

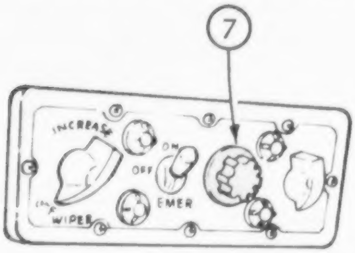


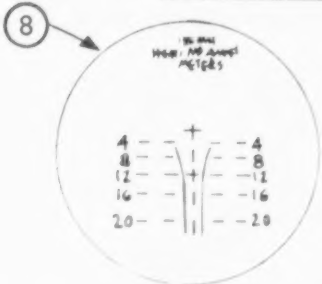


## 2-33. Operation of Gunner's Periscope XM44 Series - continued.

6. Turn focus knob (6) to infinity.



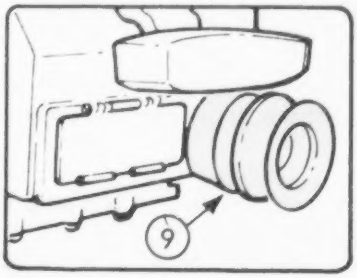


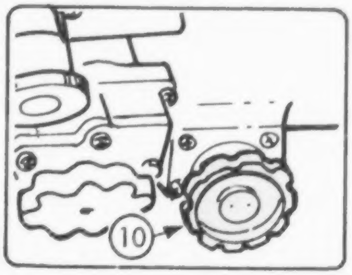


**NOTE: In a good pattern, the reticle is barely visible.**

7. Adjust reticle light intensity knob (7) until you get a good reticle pattern (8).

**NOTE: When you're scanning for targets, turn off reticle light and you'll see a lot better. If you're on emergency power, use reticle light as little as possible to conserve battery power.**





8. Look through eyepiece (9) and pull out and turn diopter knob (10) until reticle is sharp.

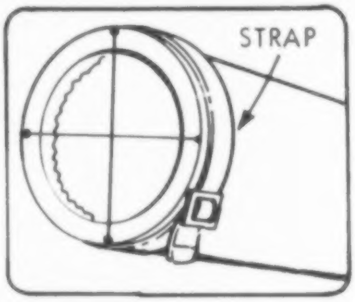
9. Set periscope on an aiming point and focus knob (6) until the target is sharp. If the sharpness of reticle changes, readjust with diopter knob.

**NOTE: Each time you change targets you must adjust focus.**

10. If you're going to boresight, see paragraph 2-34 (starting on page 2-67). If not, place ON/OFF EMER switch to OFF. Turn filter lever (2) to DARK (XM44) or OFF (XM44E1/XM44E2). Close ballistic cover.

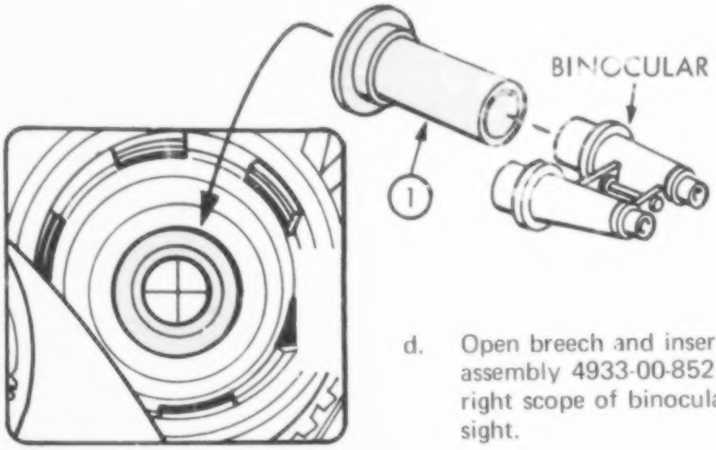
## 2-34. Boresighting Gun/Launcher.

a. Position vehicle on level ground.



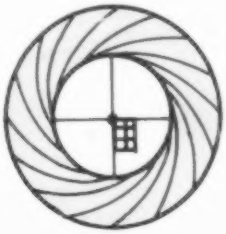
b. Place crosshairs (e.g., black thread) over reference marks on gun muzzle, and secure with tape or strap.

c. Select an aiming point with sharply defined vertical and horizontal lines (see e. below) at an approximate distance of 1200 meters. If safety permits, laser range finder can be used to determine distance.

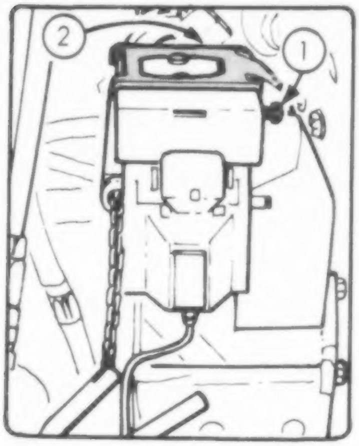


d. Open breech and insert breech boresight assembly 4933-00-852-6310(1). Insert right scope of binocular M17A1 in boresight.

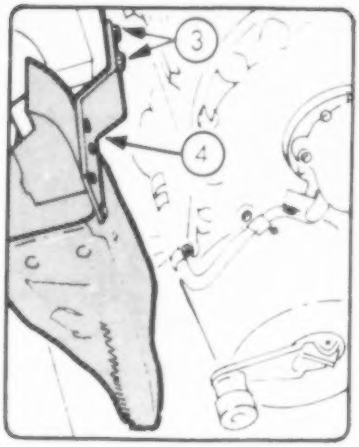
e. While looking through binocular-boresight assembly, have gunner traverse turret and elevate or depress gun until crosshairs are aligned with aiming point.



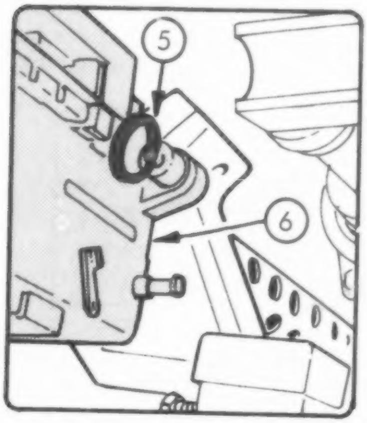
## 2-35. Boresighting 7.62-MM Machine Gun.



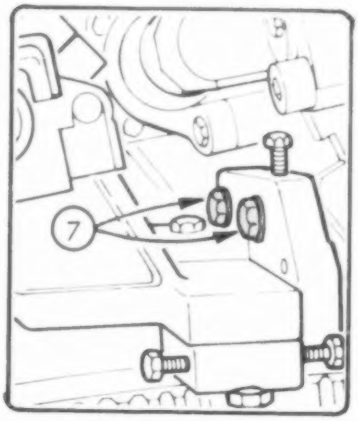
a. Loosen two screws (1) and remove link chute extension (2).



b. Remove two screws and washers (3); remove bracket with spent link chute and bag (4).

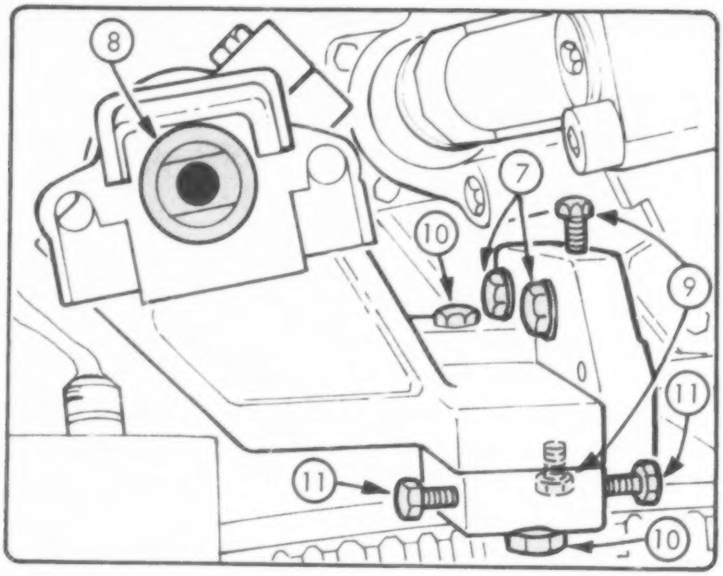


c. Pull rearward on disconnector ring (5). Rotate and remove receiver (6).



d. Loosen two mounting screws (7) slightly.

## 2-35. Boresighting 7.62-MM Machine Gun - continued.



e. Look through barrel (8) with binoculars and loosen upper or lower adjusting screw (9). You can't see the lower screw; it's directly below the upper one. Align barrel in elevation with distant aiming point. Tighten opposite screw and two mounting screws (7).

▦

f. Loosen two mounting screws (10) slightly.

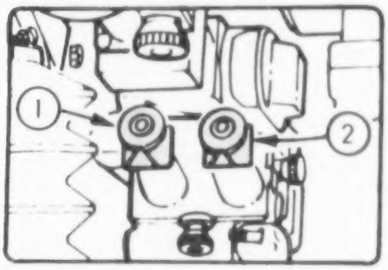
g. Look through barrel (8) and loosen left or right adjusting screw (11) to align barrel in azimuth with aiming point. Tighten opposite adjusting screw and two mounting screws (10).

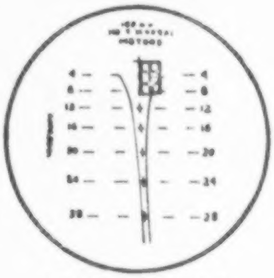
▦

h. Install items removed in steps a through e (starting on page 2-68).

## 2-36. Boresighting M127 and M127A1 Telescopes.

a. Turn on telescope (page 2-59). Set FIRE CONTROL selector at CONV.

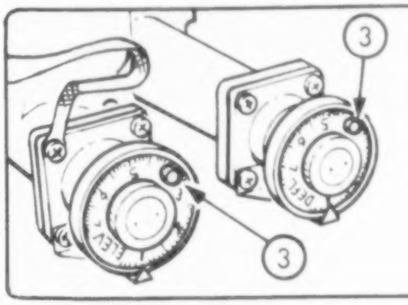




CONV RETICLE

b. With gun/launcher layed on distant aiming point, look through telescope and lay CONV reticle pattern on same point by pulling out and turning conventional elevation (1) and deflection (2) knobs.

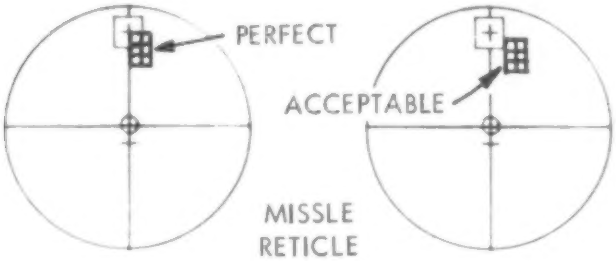
c Slip scales on elevation and azimuth boresight knobs to position 1.



NOTE: To slip dial scales, you turn the scale only with black knob (3).

## 2-36. Boresighting M127 and M127A1 Telescopes - continued.

d. Turn FIRE CONTROL selector to MISSILE position.

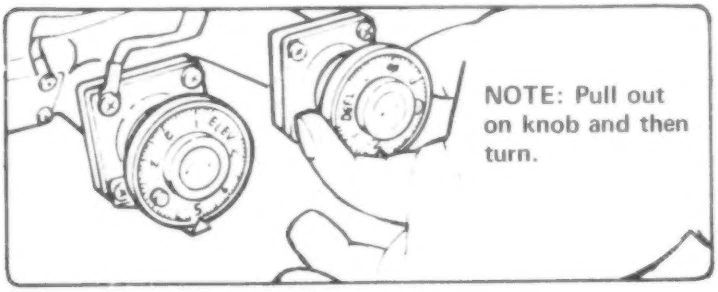


e. Look through telescope, but do not adjust. A portion of the aiming point, any portion, must align with the square area of missile reticle.

f. If you don't get an alignment on the missile reticle, do the checksight lamp alignment test, paragraph 2-48, step e. (starting on page 2-102). Again check aiming point. If you still don't get an alignment, you'll need organizational maintenance help.

**NOTE: If you need to zero your telescope see paragraph 2-38 (starting on page 2-73). If you're not going to zero, crank in the established or emergency zero settings at step g.**

g. If you don't have to zero, turn CONV elevation and deflection knobs to settings determined after a previous zero, see paragraph 2-38 (starting on page 2-73). For an emergency zero, turn CONV elevation knob to 5 and deflection knob to 2.

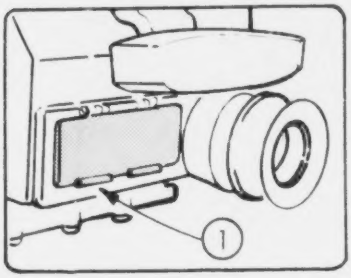


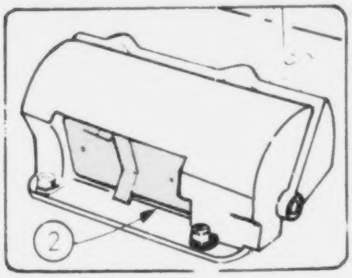
**NOTE: Pull out on knob and then turn.**

h. Slip scales on deflection and elevation knobs to 4.

## 2-37. Boresighting Periscope XM44 Series.

a. You must boresight telescope first (paragraph 2-36 starting on page 2-70). Use the same distant aiming point for boresighting your periscope.

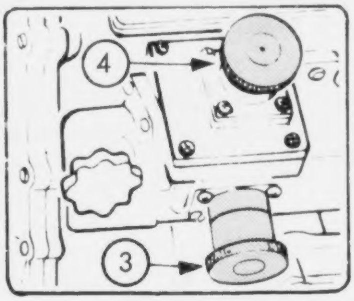




b. Close cover (1) on view window.

c. Open ballistic cover and snap boresight aid (1240-00-950-1605 (2)) over outer window.

d. Place filter lever at DARK position and turn on periscope, (paragraph 2-33, step c. 3, page 2-65).

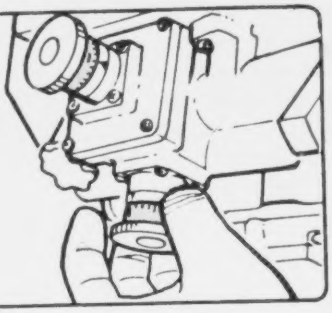


e. Insure telescope CONV reticle is still layed on distant aiming point (page 2-60). Then, look through periscope eyepiece and lay reticle pattern on same point by pulling out and turning elevation (3) and deflection (4) knobs. Turn periscope OFF and move filter lever to the OFF position. Remove boresight aid.

**NOTE: If you can't align the reticle, you'll need organizational maintenance help.**

**NOTE: If you're going to zero the periscope, skip step f. and go on to paragraph 2-38 (starting on page 2-73).**

## 2-37. Boresighting Periscope XM44 Series - continued.



**NOTE: To slip dial scales, turn only the scales. To turn knobs pull out on knob and turn.**

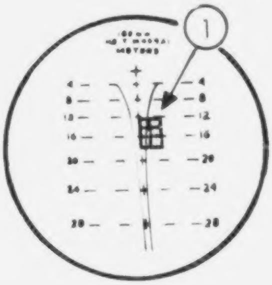
f. Slip dial scales on deflection and elevation knobs to 4.

g. Turn elevation and deflection knobs to establish zero. Your established zero is the setting determined after you have once zeroed. If you do not have an established zero, turn to emergency zero of 5 for elevation and 2 for deflection.

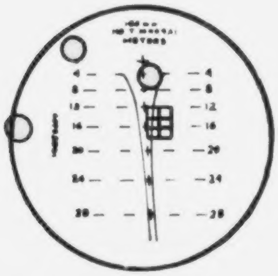
## 2-38. Zeroing Telescope M127 and M127A1 and Periscope XM44 Series.

a. Before starting, make sure:

1. Telescope and periscope are boresighted (paragraph 2-36, page 2-70).
2. Telescope and periscope reticle patterns are still layed on 1200 meter distant aiming point.
3. FIRE CONTROL selector is at CONV.



b. Look through telescope and, using manual controls, lay 1200-meter cross on distant aiming point (1).

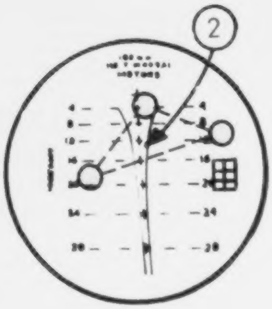


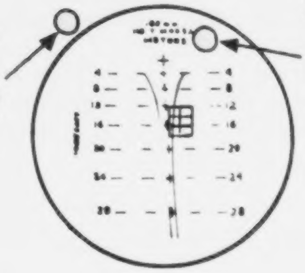
c. Fire three rounds (of same lot number) to form a shot group.

**NOTE: Re-lay weapon after each round.**

## 2-38. Zeroing Telescope M127 and M127A1 and Periscope XM44 Series - continued.

d. With 1200-meter cross on aiming point. determine center point of shot group. Pull out, turn, and adjust CONV elevation and deflection knobs to bring 1200-meter cross (2) to center point.





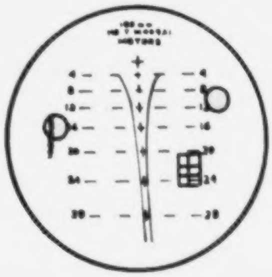
1ST ROUND OVER 24 INCHES FROM AIMING POINT

2ND ROUND LESS THAN 24 INCHES FROM AIMING POINT

TELESCOPE ZEROED

**NOTE: Use ammunition of the same lot number for all zeroing.**

e. With manual controls, again lay 1200-meter cross on aiming point and fire check round. Inspect target. If shot strikes within 24 inches of aiming point, your telescope is zeroed. If not, fire a second check round. If it strikes within the 24-inch limitation, your telescope is zeroed and you can go on to step h. If the second round is also outside the 24-inch limitation go to step f.

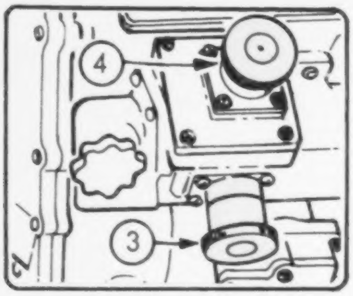


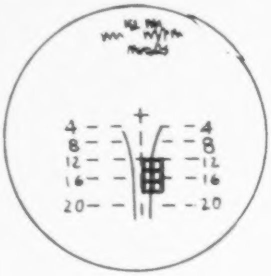
f. Re-lay on aiming point. Determine the center point of the two check rounds. Pull out and adjust CONV elevation and deflection knobs to bring 1200 meter cross to this center.

**NOTE: Remember to use ammunition of the same lot number for all zeroing.**

## 2-38. Zeroing Telescope M127 and M127A1 and Periscope XM44 Series - continued.

g. Now, again using manual controls, lay 1200-meter cross on aiming point and fire another check round. Check target. If shot strikes within 24 inches of aiming point, your telescope is zeroed. BUT, if this 3rd check round strikes outside the 24-inch radius, you'll have to go back and repeat the boresighting and zeroing procedure.





h. If telescope is zeroed, again re-lay 1200-meter cross on aiming point. Look through periscope eyepiece and pull out and adjust elevation knob (3) and deflection (4) knob until 1200-meter cross is aligned with same aiming point.

i. Now you're zeroed. Record and store your established zero (knob settings) in a convenient part of the turret for easy reference, using format below:

TELESCOPE (CONV) Elevation ______________
Deflection ______________

PERISCOPE Elevation ______________
Deflection ______________

j. Slip dial scales on telescope CONV elevation and deflection knobs, and periscope elevation and deflection knobs to 4.

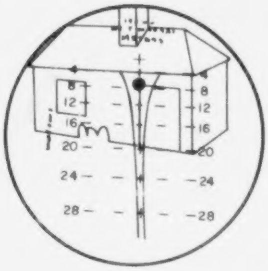
## 2-39. Zeroing 7.62-MM Machine Gun.

a. Select a target at a distance of 800 meters.

b. With vehicle engine running, turn on TURRET CONTROL; turn FIRE CONTROL selector to COAX.

**CAUTION: Don't touch boresight knobs on telescope. You only use these knobs when you boresight/zero with gun/launcher.**

## 2-39. Zeroing 7.62-MM Machine Gun - continued.



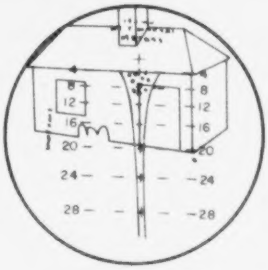
c. Look through telescope; manually elevate/ depress and traverse until you get the 800-meter mark on target.

d. Fire a burst of 20 to 25 rounds if using the M73 machine gun and 20 to 30 rounds with the M219 machine gun.

e. Check reticle in telescope. If the 800-meter mark is in center of burst, you're zeroed. If not, read on.

f. With adjusting screws, adjust machine gun toward 800-meter mark.

g. Repeat steps d., e., and f. until zeroed.



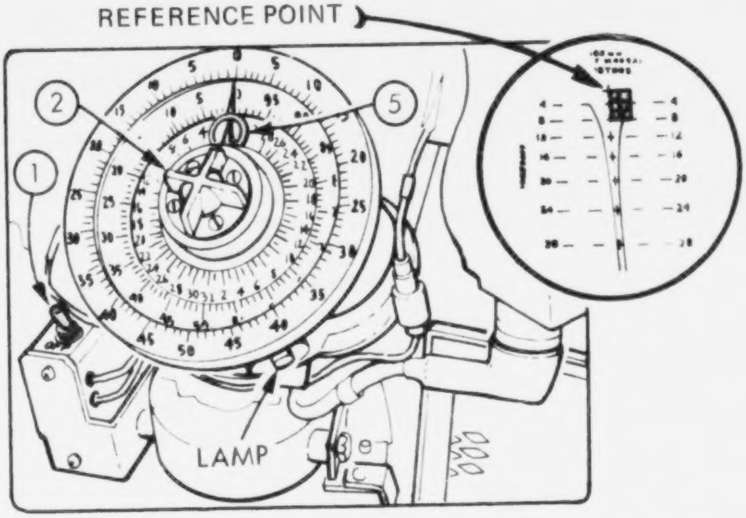
PERFECT ZERO

## 2-40. Delfection (Azimuth) Angle.

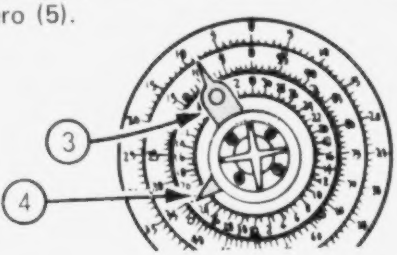
**NOTE: Position vehicle on level ground. Be sure vehicle MASTER SWITCH is on, TURRET CONTROL is on, and FIRE CONTROL selector is at COAX or CONV.**

a. Select a well defined reference point. Now look through gunner's telescope or periscope and elevate or depress and traverse until conventional reticle is layed on reference point (see next page).

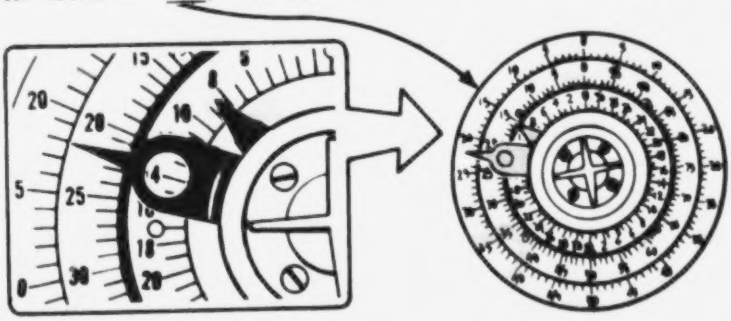
## 2-40. Deflection (Azimuth) Angle - continued.



b. At azimuth indicator (turn on lamp switch (1) if needed), turn resetter knob (2) until micrometer pointer (3) lays on azimuth pointer (4). Press down on knob (2) and turn lay at zero (5).



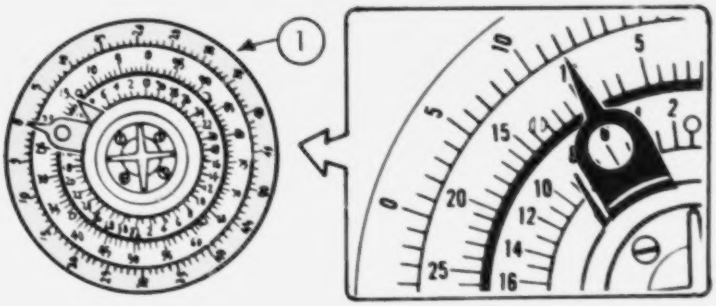
c. When you locate a target, you can find the deflection by traversing turret until CONV reticle is layed on target. Your deflection is the sum of your azimuth pointer (scaled to 100 mils) and micrometer pointer (scaled to 1 mil) . . . For instance, if you've traversed left to get on target and your indicator looks like this, then you have a left deflection of 822 mils.



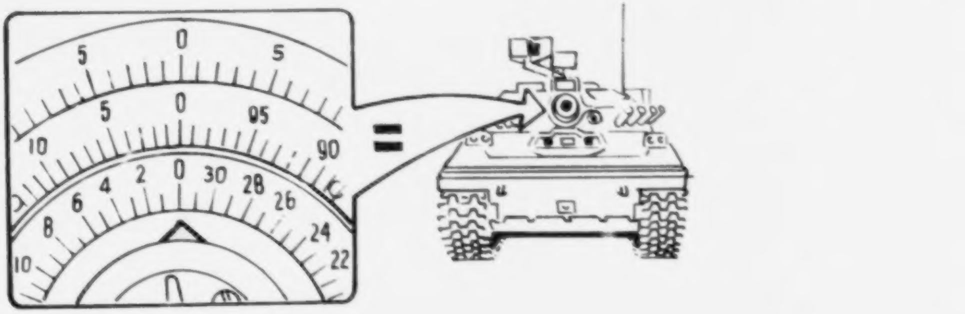
## 2-40. Deflection (Azimuth) Angle - continued.

d. If you must make a small deflection correction (50 mils or less in either direction), you can use the gunner's aid dial (1). Here's how:

Say your first deflection was 822 mils to the left. The commander determines you should deflect 12 mils to the right before firing. So, by hand, turn gunner's aid dial until its zero is aligned with the micrometer pointer. Now, slowly, traverse turret to the right until the micrometer pointer aligns with the 12 mils reading on the gunner's dial. This eliminates the mental subtraction of 12 from 22.



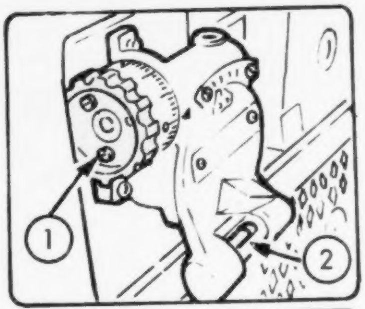
NOTE: The directional pointer tells you how far you've traversed gun from front-center of vehicle. You can't adjust this pointer but you can traverse turret until pointer is at zero to put your gun dead-center over the front.



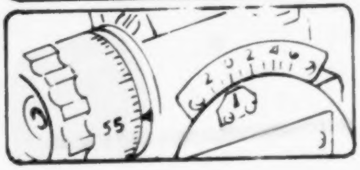
## 2-41. ELEVATION ANGLE.

**NOTE: If you want to check the accuracy of your M13A1C quadrant, ask organizational maintenance to verify it by using the M1A1 gunner's quadrant.**

a. Quadrant M13A1C: Let's say you need an elevation of 155 mils from zero elevation. First zero quadrant. Now, turn micrometer knob (1) counterclockwise a full turn, then keep turning until black numbers are at 55. Elevate gun until bubble (2) centers.



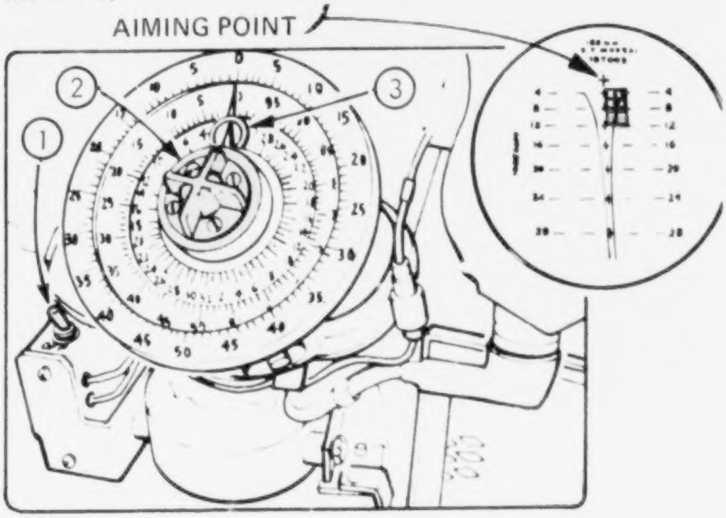
b. If you want to lower gun below zero elevation, here's how: Say you need a depression of -112 mils. Zero quadrant and turn micrometer knob clockwise a full turn. Keep turning until red numbers are at 12. Depress gun until bubble centers.



## 2-42. Accuracy Test (Indirect Fire-Control Instruments).

**NOTE: Vehicle must be on level ground with MASTER switch and TURRET CONTROL switch ON and FIRE CONTROL selector at CONV.**

a. Look through telescope and manually elevate/depress and traverse until reticle aiming cross is on a definite aiming point (intersecting horizontal and vertical lines).



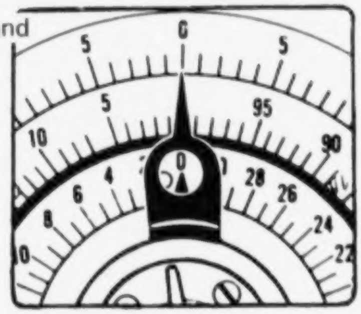
b. Turn on indicator lamp switch (1), if needed. Turn resetter knob (2) until micrometer pointer lays on azimuth pointers.

c. Press down and turn resetter knob (2) until both micrometer and azimuth pointers are at zero (3).

**NOTE: Go slow as you approach the aiming point, so you don't over-travel. If you do over-travel, don't go back, just go around again.**

d. Manually traverse turret through a complete circle, re-laying reticle aiming cross on same aiming point.

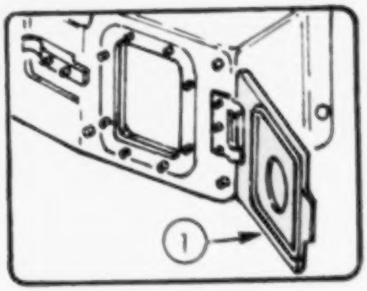
e. Check indicator. Are both micrometer and azimuth pointers at zero? If not, you'll need organizational maintenance.



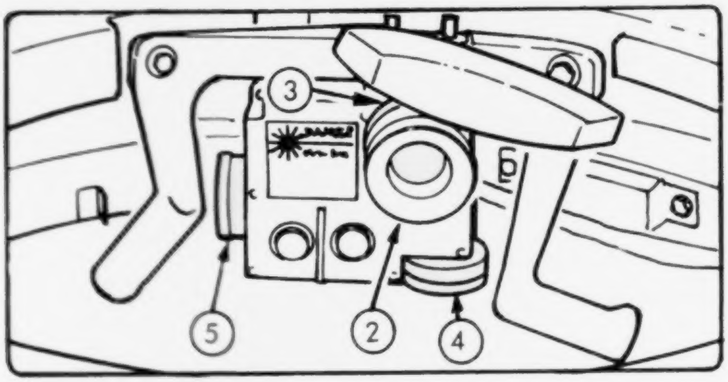
## 2-43. Optics Check of Laser Range Finder (LRF).

**WARNING: Do not fire LRF during optics check.**

a. Unlatch and open dust cover (1).



## 2-43. Optics Check of Laser Range Finder (LRF) - continued.



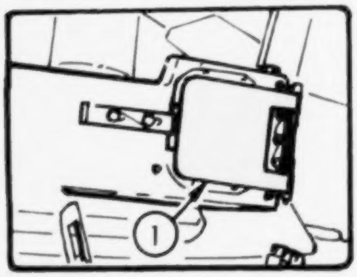
b. Look thru LRF eyepiece (2) and check for dirty and scratched optics.

c. Traverse cupola and select a number of targets beyond 200 meters. Look thru eyepiece and rotate focus ring (3) to bring each selected target into sharp focus.

d. With a selected target beyond 200 meters, rotate azimuth (4) and elevation (5) controls to get exactly on target. Check the following: Controls rotate smoothly and controls give positive sight pointing (without excessive backlash).

## 2-44. LRF Built-in Test Procedure.

a. Check to make sure dust cover (1) is closed and latched.

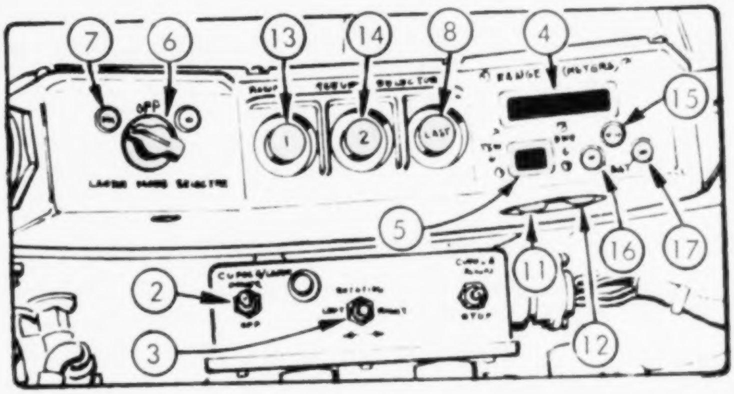


b. Tell driver to start engine and throttle to a fast idle (1000 to 1300 rpm).

## 2-44. LRF Built-in Test Procedure - continued.

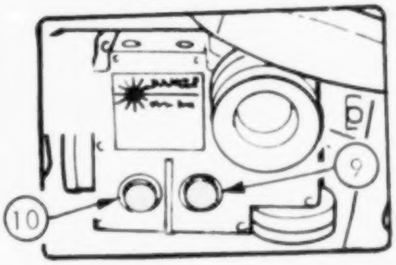
c. Push up CUPOLA/LASER switch (2) to POWER.

d. Using ROTATION switch (3), traverse cupola. Check for following readouts: RANGE (METERS) (4) is 9995, RETURNS (5) is 1. If you get these readouts, stop and notify support maintenance. You'll need the contact ring and contact brush assemblies cleaned, inspected, and adjusted.



e. At commander's display, set LASER MODE CONTROL indicator (6) to TEST . . . lamps light at TEST (7) and LAST (8); readout at RANGE (METERS) (4) is 0000; readout at RETURNS (5) is 0 . . .

Also at commander's control, lamps light at RESET (9) and RANGE (10) (without flashing).



f. Press TSW test switch (11) . . . All lamps light on commander's display and commander's control . . . Also, readout at RANGE (METERS) is 8888, readout at RETURNS is 8.

g. While pressing the TSW switch, press DMR dimmer switch (12) several times . . . all lamps should alternately dim and brighten each time switch is pressed.

## 2-44. LRF Built-in Test Procedure - continued.

h. Press RANGE pushbutton (10) . . . readout at RANGE (METERS) is 0830 to 0860; readout at RETURNS is 1.

i. Press RANGE pushbutton a second time . . . readout at RANGE (METERS) is 1830 to 1860; readout at RETURNS is 2.

j. Press RANGE pushbutton a third time . . . readout at RANGE (METERS) is 2830 to 2860; readout at RETURNS is 3.

k. Press RANGE pushbutton a fourth time . . . readout at RANGE (METERS) is 2830 to 2860; readout at RETURNS is 4.

l. At RANGE RETURN SELECTOR, press pushbutton 1 (13). RANGE SELECTOR 1 lamp lights and RANGE RETURN SELECTOR LAST lamp goes out. Readout at RANGE (METERS) is 0830 to 0860.

m. At RANGE RETURN SELECTOR, press pushbutton 2 (14). RANGE RETURN SELECTOR 2 lamp lights and RANGE RETURN SELECTOR 1 lamp goes out. Readout at RANGE (METERS) is 1830 at 1860. Readout at RETURNS is 4. Press RESET button (9). RANGE RETURN SELECTOR 2 lamp goes out and RANGE SELECTOR LAST lamp lights . . . readout at RANGE (METERS) is 0000; readout at RETURNS is 0.

n. Press and hold RANGE pushbutton . . . light should light at MALF (15), readout at RANGE (METERS) is 0002. Readout at RETURNS is 0.

o. Turn CUPOLA/LASER switch to OFF . . . readout at RANGE (METERS) is 0001. Lamps light at MALF (15) and at DR (16) . . . if auxiliary power supply is low, lamp lights at LOW (17).

## 2-44. LRF Built-in Test Procedures - continued.

p. Push up CUPOLA/LASER switch to POWER . . . readout and lighted lamps at step "o." should disappear.

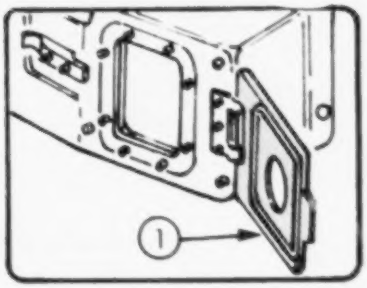
q. Set LASER MODE CONTROL indicator (6) to ON.

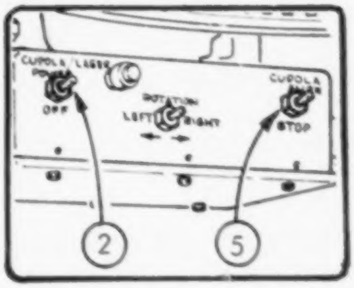
r. Press (flashing) RANGE pushbutton (10) . . . readout at RANGE (METERS) is 9995. Readout at returns is 0.

s. Shutdown in sequence: LASER MODE CONTROL indicator to OFF, CUPOLA/LASER switch to OFF, and last, tell driver to turn off engine.

## 2-45. LRF Firing Test - Normal Conditions.

**WARNING: Make certain friendly troops are not near the line-of-sight of the laser beam. Blindness can result if hit in the eye by the laser beam . . . either directly or reflected by a shining surface.**





a. Select a target at a known range . . . the range must be between 200 and 4,000 meters.

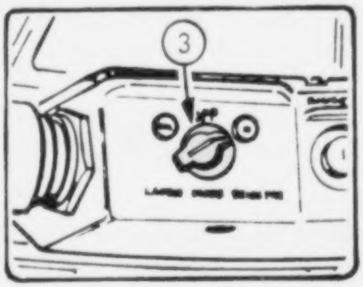
b. Unlatch and open dust cover (1).

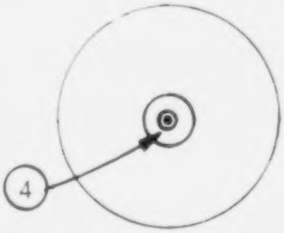
c. Tell driver to start engine and throttle to a fast idle (1000 to 1300 rpm).

d. Push up CUPOLA/LASER switch (2) to power.

e. At commander's display, set LASER MODE CONTROL indicator (3) to ON.

## 2-45. LRF Firing Test - Normal Conditions - continued.



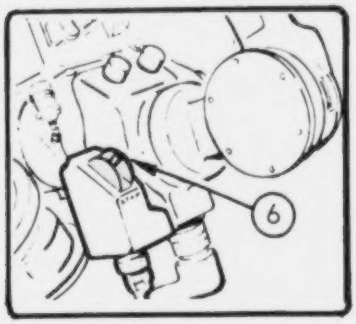


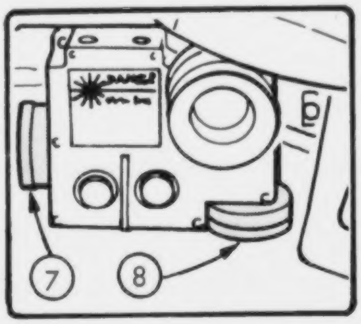
**NOTE: Sight on target so complete cross section (4) of laser beam hits target . . . with no obstructions between LRF and target.**

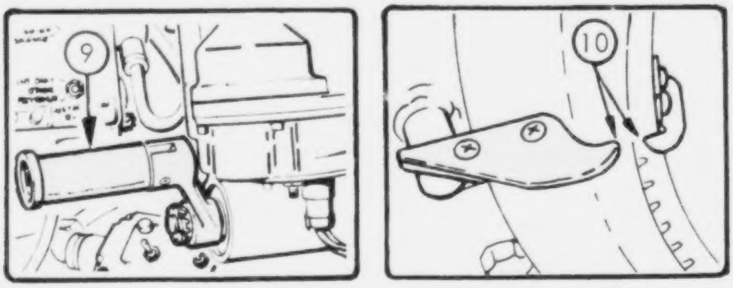
f. Have gunner traverse gun/launcher on the selected target. Traverse LRF on same target either electrically or manually:

**WARNING FOR M551 A1: Make sure loader is clear and informed before operating cupola.**

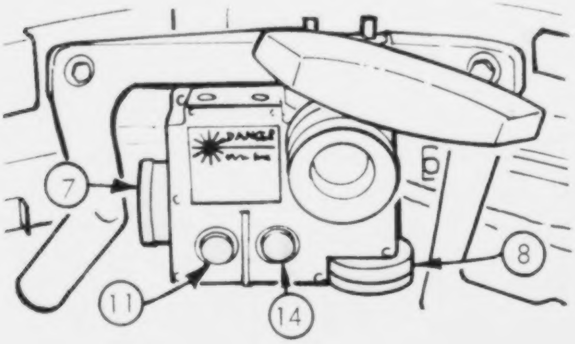
1. ELECTRICALLY - Push up on CUPOLA ALIGN switch (5) or remote switch (6) . . . either switch will traverse LRF in alignment with gun/launcher . . . at commander's control, adjust elevation control (7) to get cross section of LRF sight on target . . . adjust azimuth control (8) if needed.







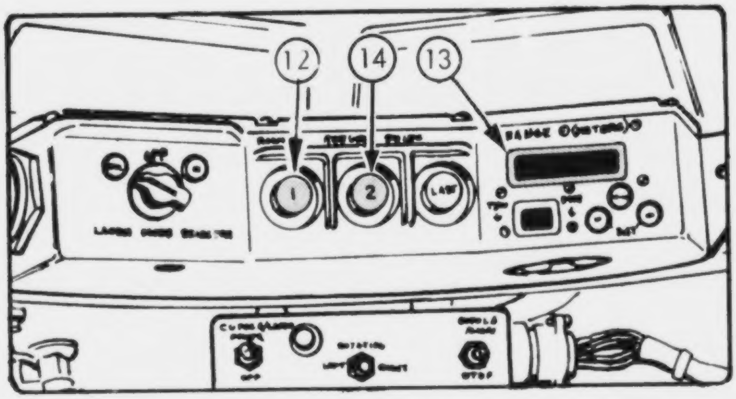
2. MANUALLY - Turn handle (9) until index pointers (10) match up. At commander's control, adjust elevation control (7) to get cross section of LRF sight on target . . . adjust azimuth control (8) if needed.



**WARNING: When laser is fired, target can be viewed ONLY thru LRF eyepiece or gunner's M127A1 telescope (with filter lever in full clockwise position) . . . they're safety filtered. DO NOT view the target thru any other M551A1 optics . . . and NEVER eyeball the target. The M127 telescope has no laser filter.**

g. Warn crew before firing laser.

h. Fire laser by pressing RANGE pushbutton (11).



i. Tell crew that laser has been fired.

j. With no obstructions between target and laser beam, at RANGE RETURN SELECTOR, press button 1 (12).

k. Check readout at RANGE (METERS) (13). Readout should be within 10 meters of the known distance to the target.

l. Press RESET pushbutton (14).

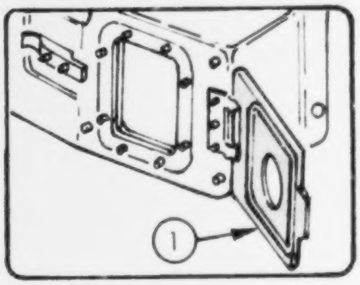
m. At 20 second intervals, repeat steps g. through l. five more times . . . giving you a total of six laser fires and six readouts.

## 2-46. Preparation for Firing LRF.

**WARNING: Make certain friendly troops are not near the line-of-sight of laser beam. Blindness can result if hit in the eye by the laser beam . . . either directly or reflected from a shiny surface.**

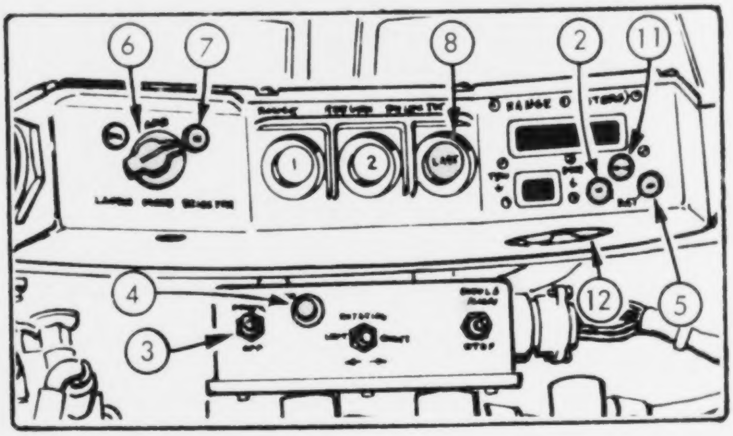
## 2-46. Preparation for Firing LRF - continued.

**WARNING: To prevent accidental alinement of cupola to main weapon, make certain the MASTER SWITCH and laser ON/OFF switch are at OFF before crew leaves vehicle.**



a. Unlatch and open dust cover (1).

b. Tell driver to turn on MASTER switch. If conditions permit, tell driver to start engine and throttle to a fast idle (1000 to 1300 rpm).



**NOTE: An auxiliary power supply is provided only for emergency use. This power supply provides the juice to your LRF system when vehicle power is off or low . . . you'll know it's being used when the DR lamp (2) lights.**

c. Push up CUPOLA/LASER switch (3) to POWER . . . lamp (4) should light.

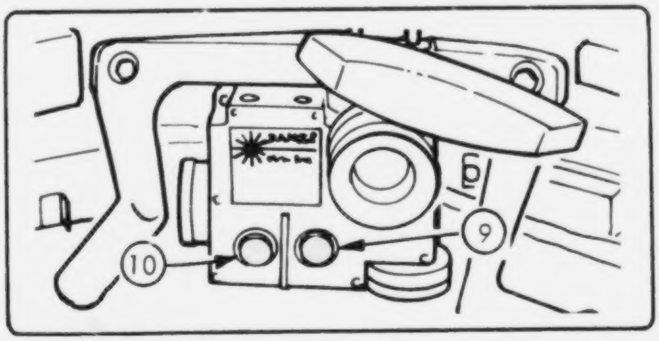
## 2-46. Preparation for Firing LRF - continued.

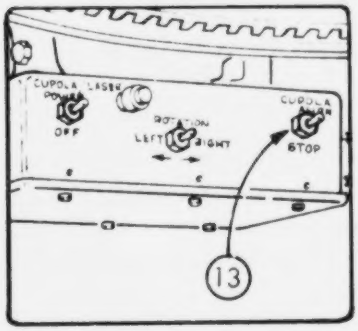
**NOTE: If you're using the auxiliary power supply . . . that's when the DR lamp (2) lights . . . check the (amber) LOW lamp (5). A lit LOW lamp means your auxiliary power supply is low . . . you'll need organizational maintenance to fix it.**

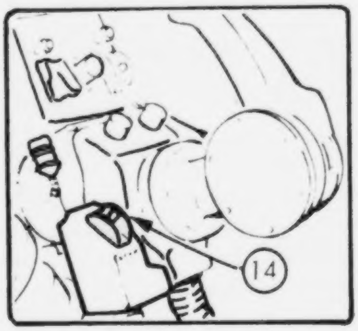
d. At commander's display, set LASER MODE CONTROL (6) to ON . . . lamps light at ON (7) and LAST (8). Also, at commander's control, lamp lights at RESET (9) and, within 4 seconds, lamp flashes at RANGE (10).

**CAUTION: Eyeball the MALF lamp (11) often. When it lights, there's something wrong with the LRF circuitry . . . you'll need organizational maintenance to fix it.**

e. Check for proper lighting of LRF controls. If lamps are too dim, push DMR (12) to brighten; if too bright, push DMR switch to dim.

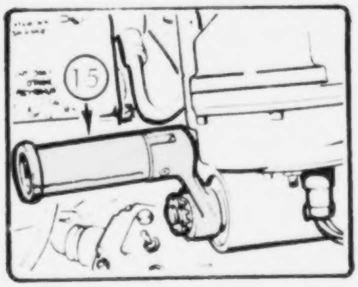


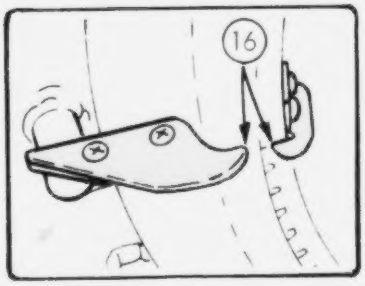




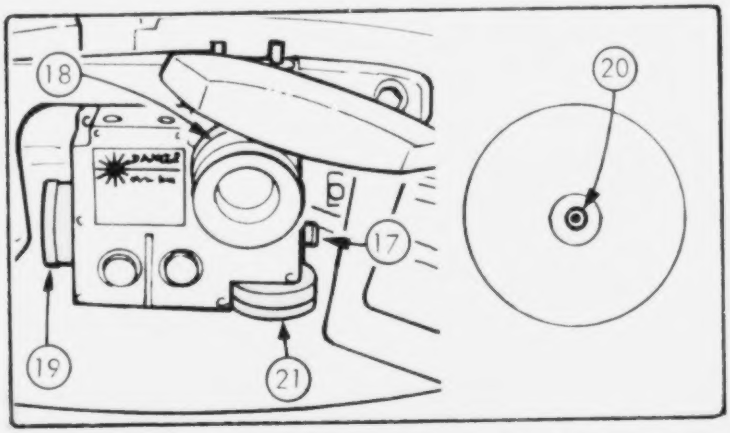
f. Electrically Traversing Cupola. If gunner has a target in his scope, traverse LRF on same target by pushing up on CUPOLA ALIGN switch (13) or remote switch (14) . . . either switch will traverse LRF to aline with gun/launcher.

## 2-46. Preparation for Firing LRF - continued.





g. Manually Traversing Cupola. If gunner has a target in his scope, traverse LRF on same target by turning handle (15) until index pointers (16) match up . . . once the pointers are matched, the LRF is alined with gun/launcher.



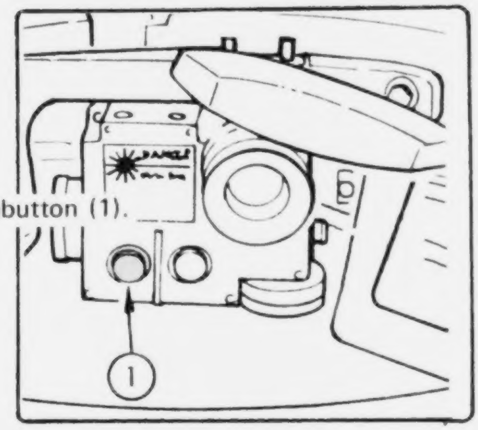
**NOTE: If the reticle in your LRF sight is too bright or too dim, adjust intensity by turning RETICLE ILLUM (17).**

h. Look thru LRF eyepiece, adjust focus ring (18) for sharpness. At commander's control adjust elevation control (19) to get reticle cross section (20) on target . . . adjust azimuth control (21) if needed.

## 2-47. Firing LRF.

**WARNING. When laser is fired, the target can be viewed ONLY through the LRF eyepiece or gunner's telescope M127A1 (with filter lever at full clockwise position) . . . they're safety filtered. DO NOT view the target through any other M551A1 optics . . . and NEVER eyeball the target. The M127 telescope has no laser filter.**

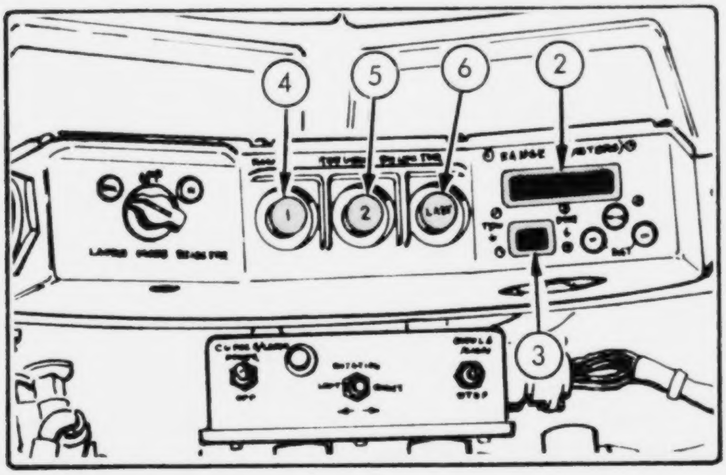
## 2-47. Firing LRF - continued.



a. Warn crew before firing laser.

b. Fire laser by pressing RANGE pushbutton (1).

c. Tell crew the laser has been fired.



**NOTE: Until one of the RANGE RETURN SELECTORS is pressed, the readout at RANGE (METERS) (2) will be the last target range.**

d. Check the RETURNS (3) readout. This tells you how many "replies" the LRF received.

  1. If the readout is 1, only one reply was received. If on target, it also indicates a direct, unobstructed hit of target.

  2. If the readout is 2, or 3, or more, the readouts indicates the number of replies received and that part of the laser beam hit an obstruction and/or background in addition to hitting the target.

e. Determine the correct RANGE RETURN SELECTOR pushbutton.

1. Press pushbutton 1 (4) if laser beam first hits target as indicated by following examples.

EXAMPLE 1: RETURNS readout is 1 - AND - total cross section of laser beam hits target.

EXAMPLE 2: RETURNS readout is 2 or more - AND - no obstructions between laser beam and target. Part of cross section beam hits target . . . the other part(s) of cross section hits background.

2. Press pushbutton 2 (5) if laser beam hits an obstruction before hitting target as indicated by following examples:

EXAMPLE 1: RETURNS readout is 2 - AND - part of cross section of beam hits obstruction between LRF and target . . . THEN, cross section of beam hits target.

EXAMPLE 2: RETURNS readout is 3 or more - AND - part of cross section of beam hits obstruction between LRF and target. THEN, part of cross section of beam hits target and finally, part of cross section of beam hits background.

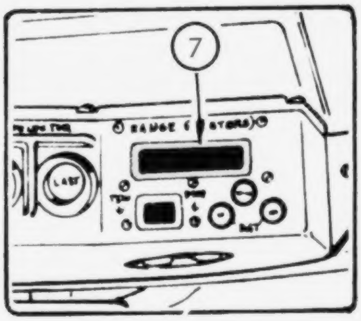
3. Press pushbutton LAST (6) if laser beam hits an obstruction, or two obstructions, before hitting target as indicated by following examples:

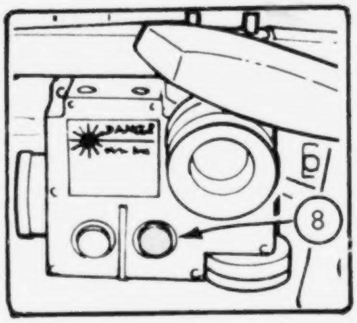
EXAMPLE 1: RETURNS readout is 2 - AND - part of cross section of beam hits obstruction between LRF and target and finally, part of cross section goes out into space (no background).

EXAMPLE 2: RETURNS readout is 3 - AND - part of cross section of beam hits two obstructions between LRF and target. Then, part of cross section hits target.

EXAMPLE 3: RETURNS readout is 4 through 8 - AND - part of cross section of beam hits two obstructions between LRF and target. Then, part of cross section hits target. Finally, part of cross section hits background(s).

## 2-47. Firing LRF - continued.





f. Check readout at RANGE (METERS) (7) . . . it'll tell you the distance to the target.

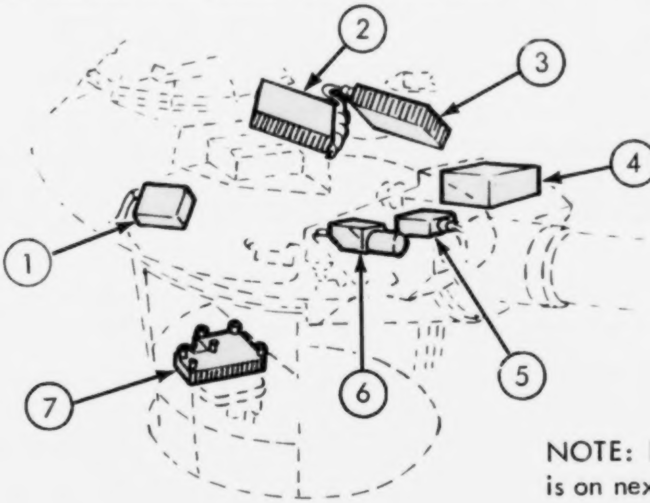
**NOTE: If a visual check of the target distance does not compare with the readout at RANGE (METERS), then, make another pushbutton selection at step e. (page 2-95).**

g. To fire the laser again, press RESET (8) and repeat steps a. through f. of paragraph 2-47 (starting on page 2-93).

h. When finished, turn LASER MODE CONTROL to OFF and when conditions permit, close and latch dust cover.

## 2-48. Missile Guidance and Control System.

a. System Components. The following components comprise the system used to guide missiles fired through the gun/launcher:



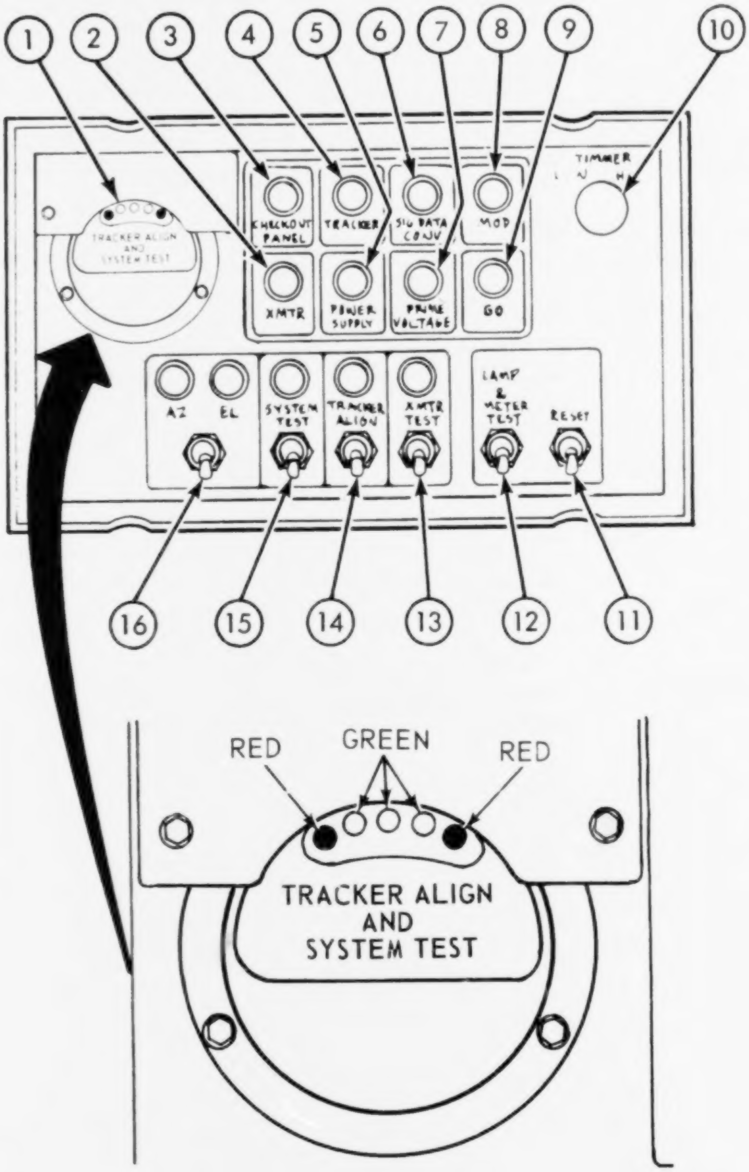
NOTE: Nomenclature is on next page.

## 2-48. Missile Guidance and Control System - continued.

| Component | Location | Function |
|---|---|---|
| 1. Remote Control Test Set | Right of gunner | A. Generates additional control signals for other guidance and control units in vehicle.<br>B. Checks operation of guidance and control system and identifies malfunctions. |
| 2. Modulator (Infrared) | Behind and to right of loader | Converts SDC signals for use in transmitter. |
| 3. Signal Data Converter (SDC) | Left of loader | Uses signals from tracker and rate sensing unit to keep missile on target. |
| 4. Transmitter (Infrared) | Outside, over on top of gun/launcher | Sends infrared signals from modulator to missile for directional changes. |
| 5. Rate Sensing Unit | Left of breech | "Tells" signal data converter how far gun/launcher moves up/down and right/left. |
| 6. Tracker (Infrared) | On top of and aligned with telescope. | "Eyes" or tracks missiles in flight. If missile is out of line, it tells the SDC unit. |
| 7. Power Supply | Under commanders' subfloor | Provides power for missile guidance and control system. |

## 2-48. Missile Guidance and Control System - continued.

a. Tracker Alignment (Self-Test). The tracker alignment (self-test) is performed with the remote control test set. The panel (shown below) indicator and switch functions are:



1
2
3
4
5
6
7
8
9
10
TIMMER
L N H
TRACKER ALIGN AND SYSTEM TEST
CHECKOUT PANEL
TRACKER
SIG DATA CONV
MOD
XMTR
POWER SUPPLY
PRIME VOLTAGE
GO
AZ
EL
SYSTEM TEST
TRACKER ALIGN
XMTR TEST
LAMP & METER TEST
RESET
16
15
14
13
12
11
RED
GREEN
RED
TRACKER ALIGN AND SYSTEM TEST

## 2-48. Missile Guidance and Control System - continued.

| Callout | Name | Function |
|---|---|---|
| 1 | Electronic Null Indicator (ENI) | 1. Indicates alignment of checksight source during checksight lamp tracker alignment test.<br>2. Indicates operational condition of rate sensing unit. |
| 2 | XMTR lamp (red) | Indicates transmitter is not operational during system self-test. |
| 3 | CHECKOUT PANEL lamp (red) | Indicates that checkout panel is not operational during system self-test. |
| 4 | TRACKER lamp (red) | Indicates that tracker is not operational during system self-test. |
| 5 | POWER SUPPLY lamp (red) | Indicates power supply is not operating. |
| 6 | SIG DATA CONV lamp (red) | Indicates that signal data converter is not operational during system self-test. |
| 7 | PRIME VOLTAGE lamp (amber) | Indicates that vehicle power is low. |
| 8 | MODE lamp (red) | Indicates that modulator is not operational during system self-test. |
| 9 | GO lamp (green) | Indicates guidance and control system is operating at end of self-test. |
| 10 | DIMMER control | Controls brightness of all but the NO/GO lamps. |
| 11 | RESET SWITCH | 1. Turns off all control signals.<br>2. Resets guidance and control system. |
| 12 | LAMP & METER TEST switch | Initiates test of all lamps and null meter on this panel. |
| 13 | XMTR TEST switch and lamp (white) | Starts transmitter test. |
| 14 | TRACKER ALIGN switch and lamp (white) | Starts tracker alignment test. |
| 15 | SYSTEM TEST switch and lamp (white) | Start system self-test. |
| 16 | AZ/EL switch and lamps (white) | Selects azimuth and elevation signals from rate sensing unit for test. Also, during tracker alignment test, indicates azimuth and elevation alinement. |

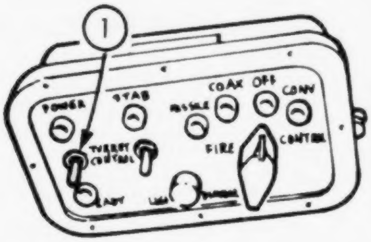
## 2-48. Missile Guidance and Control System - continued.

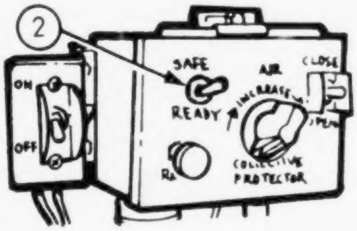
b. Preliminary Instructions.

**NOTE: Steps 3, 4 and 6 below are necessary only if you intend to launch a missile immediately after this checkout.**

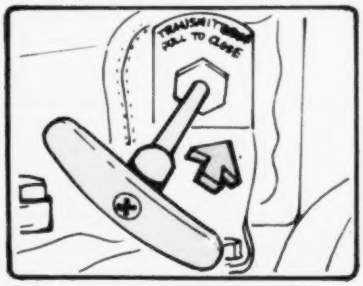
1. Has telescope been boresighted (paragraph 2-36, starting on page 2-70).

2. Are all guidance control units and cables properly connected and secured in the turret?


①
POWER
STAB
MISSILE
COAX
OFF
CONV
TURRET CONTROL
FIRE
CONTROL


②
ON
OFF
SAFE
READY
AIR
INCREASE
CLOSE
COLLECTIVE PROTECTOR

3. Is TURRET CONTROL switch (1) off? Is loader's SAFE/READY switch (2) at SAFE?


TRANSMITTER
PULL TO CLOSE

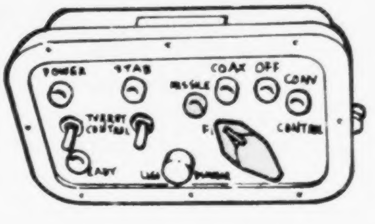
4. Open transmitter door by turning control handle counterclockwise and pushing forward. Lock door open by turning handle an eighth of a turn clockwise.

5. Tell driver to start engine and idle at about 1000 to 1300 rpm's.

6. Turn on TURRET CONTROL switch (1). POWER lamp will light . . . wait about 20 seconds until READY lamp lights.

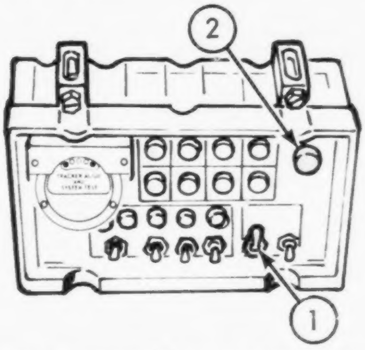
## 2-48. Missile Guidance and Control System - continued.

7. Turn FIRE CONTROL selector to MISSILE . . . lamp will light.



**NOTE: POWER SUPPLY and PRIME VOLTAGE lamps will blink at first. Once system warms up and missile reticle appears in telescope, the lamps should go out. If they stay on, notify organizational maintenance.**

c. Lamp and Meter Test.



1. Hold LAMP & METER TEST switch (1) up. All lamps should light and only the center green light emitting diode (LED) should be illuminated. If any LED other than in the center is illuminated, or if the center LED is not illuminated, notify organizational maintenance.

2. With LAMP & METER TEST switch (1) still in up position, rotate DIMMER control (2) . . . all lamps, except the red, should vary in brightness. Release switch.

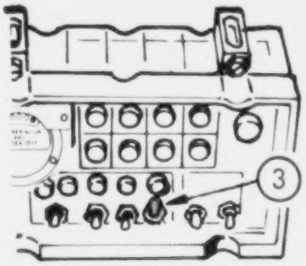
d. Transmitter Test.

**WARNING: Make certain all friendly troops are out of the path of transmitter. Regardless of distance, invisible infrared rays sent out by the transmitter can cause serious eye damage.**

**CAUTION: When testing transmitter, don't leave XMTR TEST switch (3) in up position for more than 1 minute.**

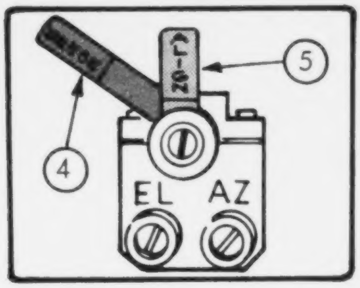
## 2-48. Missile Guidance and Control System - continued.

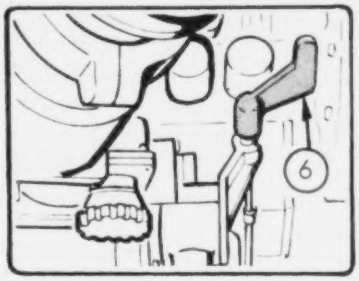
1. Turn on XMTR TEST switch (3). XMTR TEST lamp should light. Now wait . . . if XMTR TEST switch turns off in less than 10 or more than 20 seconds it indicates that the system may be defective. You'll need organizational maintenance.



2. If the XMTR TEST switch did not turn off in less than 30 seconds, push RESET switch up; then release . . XMTR TEST switch should return to off (down) position.

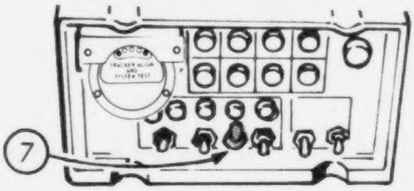
e. Checksight Lamp Alignment Test.





1. On telescope mount M149, with ERROR lever (4) at full left, move ALIGN lever (5) to full right.

2. On telescope, filter lever (6) must be at CLEAR position.



3. Push TRACKER ALIGN switch (7) up to on position; lamp should light.

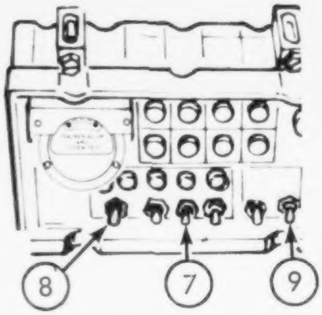
4. Look through telescope to see if a spot of light appears. If not, go to table 3-2 MALFUNCTION 62, steps 1 thru 4, page 3-50.

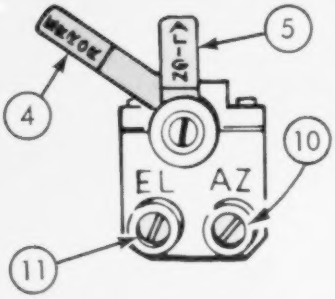
**NOTE: For better contrast when looking through telescope, have someone temporarily cover or shade the telescope opening outside the turret.**

NOTE:

When adjusting the AZ and EL telescope mount adjustments, as the spot of light in the telescope moves from perfect alignment (zero error with only the center green LED illuminated) to an alignment error within the allowable tolerance range, the green LED adjacent to the center LED will first be illuminated dimly but will increase in intensity as the alignment error tolerance limit is approached. When the alignment tolerance limit is exceeded, the adjacent red LED will become illuminated. If the alignment error is further increased, the red LED intensity will increase to maximum brightness. The direction in which the LED's illuminate will depend on the direction of the alignment error. If the system is in perfect alignment and the mount adjustment is turned clockwise the LED illumination will be clockwise. If the mount adjustment is turned counterclockwise the LED illumination will be counterclockwise.

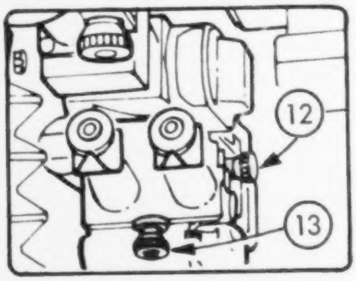
5. Push AZ/EL switch (8) to AZ (down) position . . . AZ lamp should light and only the green LED of the ENI should be illuminated. If a red LED is illuminated adjust AZ screw (10) until only the green LED's are illuminated.

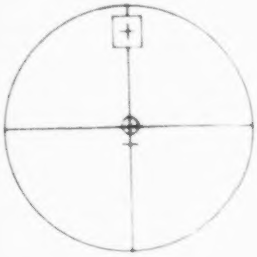




6. Push AZ/EL switch (8) to EL (up) position . . . EL lamp should light and only the green LED's of the ENI should be illuminated. If a red LED is illuminated adjust EL screw (11) until only the green LED's are illuminated.

7. Now, if you've made any screwdriver adjustments at step 5 and/or 6 above, repeat these steps until you get only the center green LED illuminated or with adjacent green LED's dimly illuminated.





8. Look into telescope. Using missile horizontal (12) and verticle (13) knobs, center missile reticle circle over spot of light.

9. Move ERROR lever (4) to full right position. Push AZ/EL switch (8) to EL (up) position. . . ENI LED's to the left illuminate.

**2-48. Missile Guidance and Control System-continued.**

10. Push AZ/EL switch (8) to AZ (down) position . . ENI LED's to the right illuminate.

11. Move ERROR lever (4) to full left position . . only green ENI LED's illuminate.

12. Push AZ/EL switch (8) to EL (up) position . . only green ENI LED's illuminate.

**NOTE:**

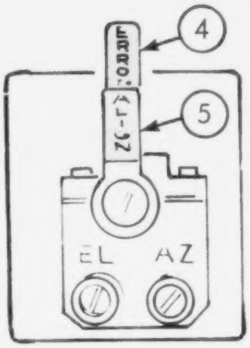
Whenever there is a rapid temperature change of 30°F or more, repeat the checksight lamp alignment test.

## 2-48. Missile Guidance and Control System - continued.

f. System Self-Test.

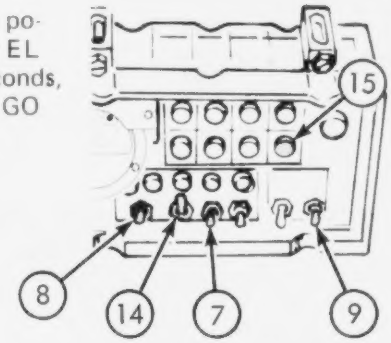
CAUTION: Before proceeding, be sure checksight lamp alignment test steps e. 1. through 13 sre performed and that missile reticle adjustment step (e. 8.). has not been changed from vibration.

1. On telescope mount, move ALIGN and ERROR levers to full right position.



NOTE: If ALIGN lever (5) resets left at any time during this test, immediately push lever to full right position and continue test.

2. Push SYSTEM TEST switch (14) to up position. SYSTEM TEST lamp and AZ or EL lamp (15) will light. After about 30 seconds, if all guidance control units are go, the GO lamp will light. If a unit malfunctions, the lamp above the problem unit will light while the GO lamp stays off.

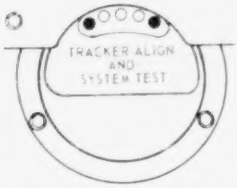


3. If a lamp above a unit lights, indicating a malfunction, hold the RESET switch (9) up and release. De-energize the system (steps h. 1. through 4. (starting on page 2-106), and notify organizational maintenance.

4. If all units are still go, push AZ/EL switch (8) to the AZ (down) position . . . AZ lamp should light.

## 2-48. Missile Guidance and Control System - continued.

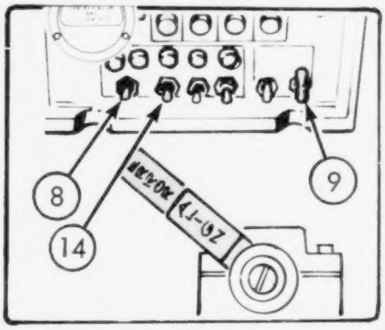
5. Traverse turret left and right. The ENI LED illumination moves in the same direction as the turret. When you stop traversind, only the green LED's should be illuminated. If not, notify organizational maintenance.



6. Push AZ/EL switch (8) to EL (up) position, the EL lamp glows, then elevate/depress gun/launcher. The ENI LED illumination moves to the right when gun/launcher is elevated, left when gun/launcher is depressed. When you stop elevating/depressing gun/launcher, , only the green LED's should be illuminated. If not, notify organizational maintenance.

7. Push RESET switch (9) . . . SYSTEM TEST switch (14) turns off (down position), and ALIGN lever moves to left position.

8. Push ERROR lever to full left position.



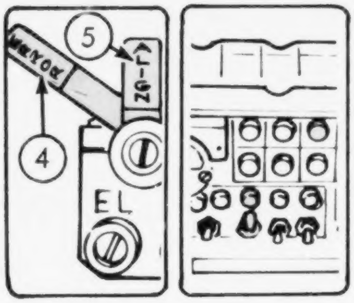
g. System Self-Test Verification.

1. With ALIGN and ERROR levers full left, push SYSTEM TEST switch (14) up to on. TRACKER lamp should light after approximately 30 seconds. If not, notify organizational maintenance.

2. Push RESET switch (9) up and release.

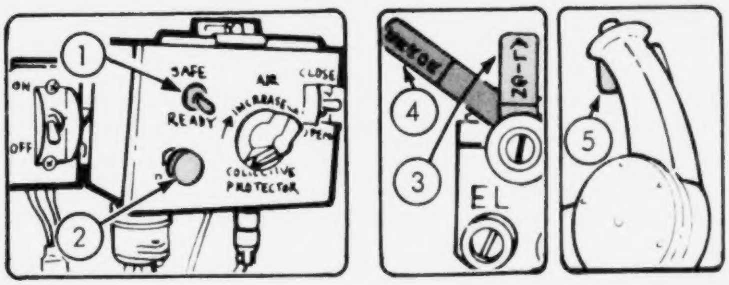
3. Move ALIGN lever (5) to full right and ERROR lever (4) full left. Again, push up SYSTEM TEST switch. SIG TRACKER lamp should light after approximately 30 seconds. if not, notify organizational maintenance.

4. Hold RESET switch (9) up and then release.



## 2-48. Missile Guidance and Control System - continued.

**WARNING: Before going on, make sure all weapons are clear of live rounds.**


1
SAFE
READY
AIR
INCREASE
CLOSE
OPEN
ON
OFF
COLLECTIVE PROTECTOR
2
ERROR
4
ALIGN
3
EL
5

5. Push SAFE/READY switch (1) down to READY position. Insure that gunner's ready lamp (2) is glowing. Move ALIGN lever (3) full right and ERROR lever (4) full left. Push SYSTEM TEST switch up.

6. Press firing trigger (5). SYSTEM TEST switch flips down, ALIGN lever moves to full left, and tracker motor runs for approximately 18 seconds. If not, notify organizational maintenance.

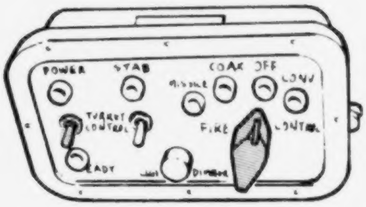
h. De-Energizing Missile Subsystem.

**NOTE: If going directly into a firing mission, DO NOT de-energize subsystem.**

1. Place SAFE/READY switch (1) in SAFE position.

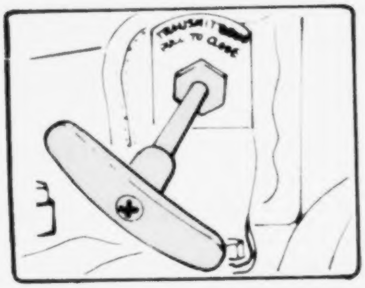
2. Place FIRE CONTROL selector at OFF. Lamp above switch goes out. Missile lamp goes out. Turn off TURRET CONTROL switch.

3. Tell driver to turn off engine.


POWER
STAB
MISSILE
COAX
OFF
CONV
TURRET CONTROL
FIRE CONTROL
DIMMER

## 2-48. Missile Guidance and Control System - continued.

4. Close transmitter door by turning control handle counterclockwise and pulling rearward. Lock door closed by turning handle an eighth of a turn clockwise.



## 2-49. Failure-to-Fire and Cookoff.

a. Preventing a Failure-to-Fire or Cookoff. You'll seldom have to face this situation if you maintain and use only authorized ammo (section V), and operate and maintain your weapons according to the procedures in this manual.

b. Be Informed. Before firing gun/launcher, machine guns, or grenade launchers, become familiar with the possible firing malfunctions that can occur . . . and the corrective procedures.

**WARNING: If you have a failure-to-fire, keep your weapon on target and keep personnel clear of muzzle and path of recoil.**

1. Misfire. A misfire is when a chambered round fails to fire after you've triggered the weapon according to firing procedures. Its cause could be a faulty firing mechanism or a faulty propelling charge. You can't be sure about a misfire . . . it could be a hangfire.

2. Hangfire. A hangfire is a delayed firing caused by a slow reacting charge. At first it seems like a misfire, but once it functions, you can be sure it's a hangfire. Be cautious, follow the specific immediate Action in Case of Failure-to-Fire for the gun/launcher or grenade launchers (starting on pages 2-114, 2-129, 2-133, 2-137 and 2-142 respectively.

3. Stoppage - machine guns only. Stoppage is any interruption in the cycle of operation caused by faulty action of the machine gun or ammo. Any stoppage must be handled as a misfire.

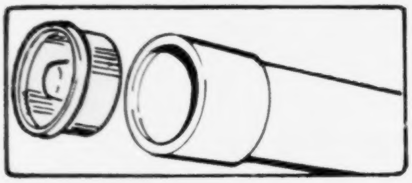
## 2-49. Failure-to-Fire and Cookoff - continued.

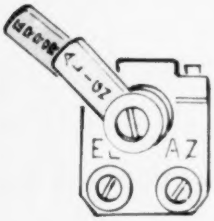
4. Cookoff - machine guns only. A cookoff is the firing of a chambered round in a hot weapon without pulling trigger. The weapon's heat fires the round rather than the firing mechanism. Be cautious, follow the specific Immediate Action in Case of Failure-to-Fire for the machine guns (paragraphs 2-52 and paragraph 2-53, step d, starting on pages 2-133 and 2-137 respectively).

## 2-50. Firing 152-MM Conventional Ammo.

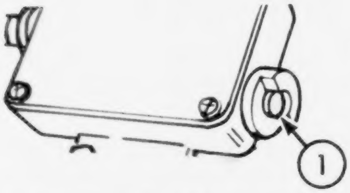
**CAUTION: Close cover of 7.62-mm machine gun before firing main gun.**

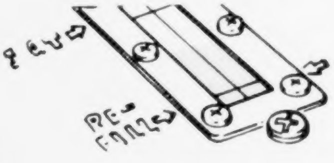
a. Preparation for Firing.





1. Is muzzle plug removed? Is gun tube free of obstructions? Is firing probe of firing mechanism clean of oil? Are ERROR and ALIGN levers, on telescope mount, at full left position?





2. Is indicator rod (1) in operating range? Is reservoir filled with enough hydraulic fluid?

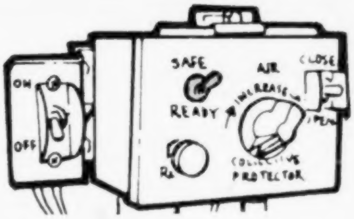
3. Is 7.62-mm machine gun cover closed and locked? Check to see if hinges are sprung or latches are not fully latched (rear).

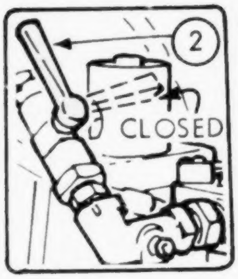
4. Is conventional ammo properly stowed? Try to stow all ammo by lot number to cut down excessive dispersion when firing.

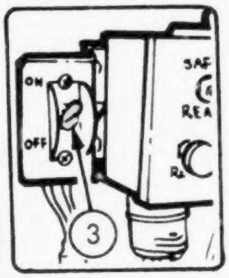
5. Tell driver to start engine and idle to at least 1000 to 1300 rpm's. Switch on turret ventilating fan.

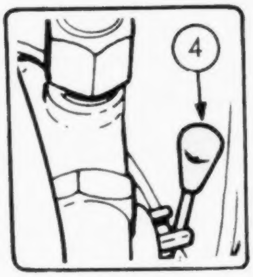
## 2-50. Firing 152-MM Conventional Ammo - continued.

6. At loader's control, is SAFE/READY switch at SAFE?


ON
OFF
SAFE
READY
AIR
CLOSE
INCREASE
OPEN
COLLECTIVE PROTECTOR




ON
OFF
SAF
REA
3



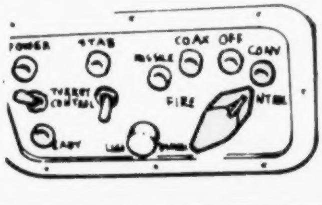
**WARNING: If scavenger system does not work, do not fire missiles or conventional ammunition on training missions until scavenger system works. Combat firings may continue at discretion of vehicle commander.**

7. Open CBSS shutoff valve (2). Turn COMPRESSOR switch (3) to ON . . . wait until gage reads above 630 psi. Now, with breach closed, trip manual discharge lever (4) for a second to see if scavenger works . . . you'll know it's working if it honks like a foghorn.

**NOTE: It takes 1-1/2 to 1-3/4 hours to fully charge CBSS system.**

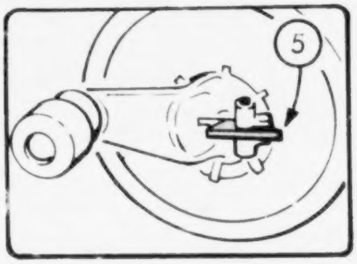
b. Loading Conventional Ammo.

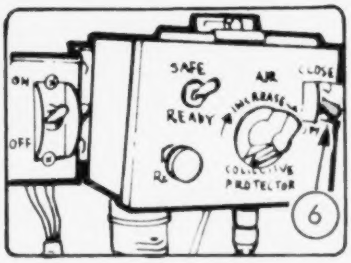
1. Push up on TURRET CONTROL switch. Wait about 20 seconds until READY light comes on. Turn FIRE CONTROL selector to CONV. If you want your gun in a stablized mode push up on STAB switch.


POWER
STAB
COAX
OFF
MISSILE
CONV
TURRET CONTROL
FIRE

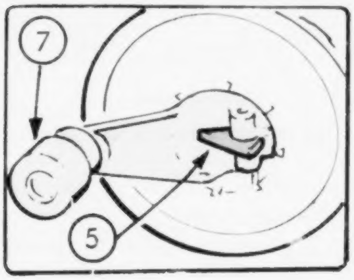
WARNING: The obturator seal must be used with all types of ammo to prevent a fire hazard and gas wash.

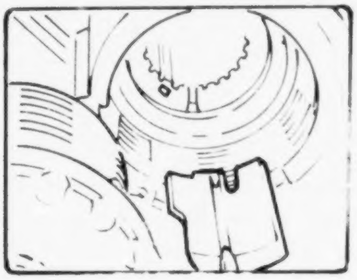
## 2-50. Firing 152-MM Conventional Ammo - continued.





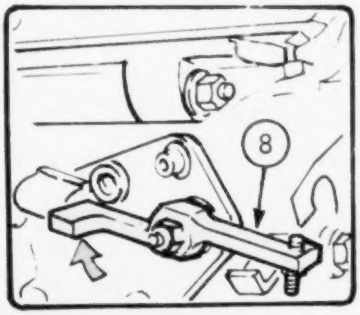
2. To open breech electrically: Snap the locking lever (5) into one of eight solts in rear cover. Hold down switch (6) until breech is fully open.





To open breech manually:
Snap locking lever (5) into the spindle slot. Turn handle (7) counterclockwise until breech is fully opened.

3. Place ejector lever (8) in up (non-eject) position.

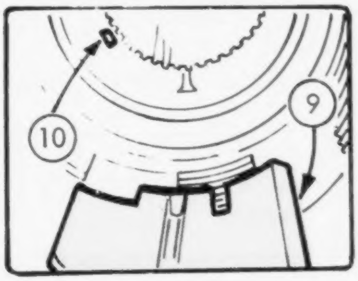


**WARNING: Ejector lever must be in up position. If it's not, and you decide not to fire, the ejector will cut through the casing when you open the breech. And, from a cut casing the propellant charge could spill out creating a fire hazard.**

## 2-50. Firing 152-MM Conventional Ammo - continued.

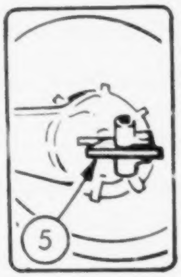
4. Remove round from stowage rack. Remove and stow ballistic (nylon) protective cover.

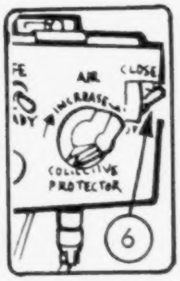
**WARNING: Avoid striking fuze or primer . . . take it easy.**

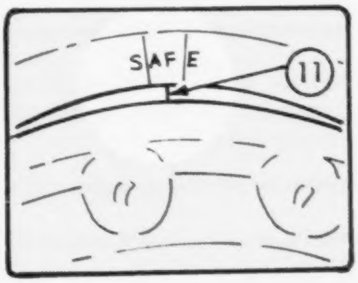


5. Place round on loading tray (9). Now, while loading round into gun tube, remove barrier bag. Shove round firmly into tube until detent pin (10) is engaged.

6. Close breech electrically or mechanically.





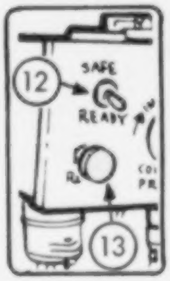


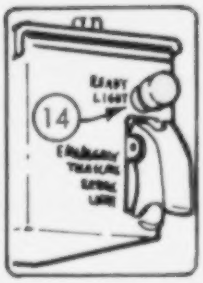
(a) To electrically close breech:
With locking lever (5) in one of eight slots in rear cover, hold up on CLOSE/OPEN switch (6) until breech is fully closed. It's fully closed when breech scribe mark (11) is within the two coupling scribe marks.

(b) To manually close breech:
With locking lever in spindle slot, turn handle clockwise until breech is fully closed. Snap locking lever back into one of the eight slots.

**WARNING: Snapping locking lever into one of eight slots frees handle from spinning once gun is fired and breech automatically opens. If you don't do this, you might get hit by the spinning handle.**

## 2-50. Firing 152-MM Conventional Ammo - continued.





7. At loader's control box, place SAFE/READY switch (12) at READY. Both loader's (13) and gunner's (14) ready lamp should light. Once they do, make sure your precharge pressure is up, then . . . you're ready to fire.

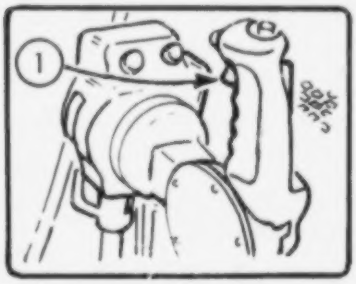
**WARNING:** If ready lamps don't light, make sure breech is fully closed (step 13). Check scribe mark (14) from side of breech keeping out of recoil path in case of a premature fire. Make sure precharge pressure is correct.

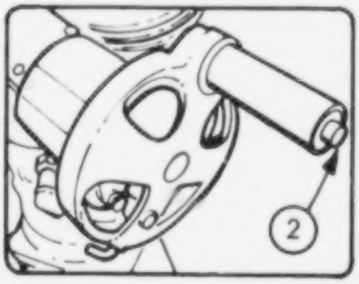
c. Firing.

**WARNING:** Before firing, make certain everyone is clear of the breech recoil path . . . it'll recoil about 15 inches. Be extra careful during rapid-firing sessions.

**CAUTION:** Make sure cover is closed on 7.62-mm machine gun before firing main gun. Before closing cover, be sure cover latch rods are forward as cover will not lock if rods are to rear.

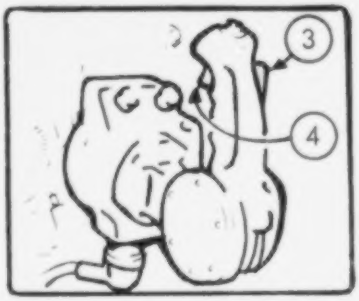
1. Who's going to fire?





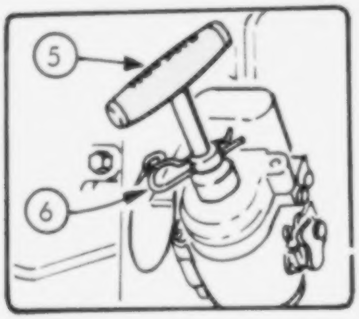
## 2-50. Firing 152-MM Conventional Ammo - continued.

(a) Gunner: If the gunner is goint to fire, he gets on target and presses trigger (1) on his control handle OR he presses the firing button (2) on his elevation handwheel . . . both will do the job. When firing with control handle, make sure elevation handwheel is in the locked position.



(b) Commander:

If the commander is going to fire, he first presses palm switch (3) to override the gunner and then presses trigger (4).



(c) Loader: In an emergency loader can fire:
With gun still on target, loader tries to fire with blasting machine. Here's how: Remove blasting machine (5) from bracket and get back on your seat (out of recoil path). Remove safety pin (6) and announce "ON-THE-WAY." Wait 1 second, then turn handle clockwise 3 times as fast as you can . . . hold handle in final position 2-3 seconds. See page 2-115 for use of blasting machine.

**NOTE: When you fire a round, here's what happens at recoil: The ventilating fan turns off, the gun recoils about 15 inches, then returns to battery. Now, the scavenging system blows out noxious gases and fumes (you'll hear a sound like a foghorn for about 2 seconds). Next, the breech opens automatically; and last, the ventilating fan turns back on.**

**WARNING: Stop if smoke or fire is seen coming from top of the coupling or around the chamber, notify support maintenance to check your obturator seal, detente, firing probe gasket or CBSS valve.**

## 2-50. Firing 152-MM Conventional Ammo - continued.

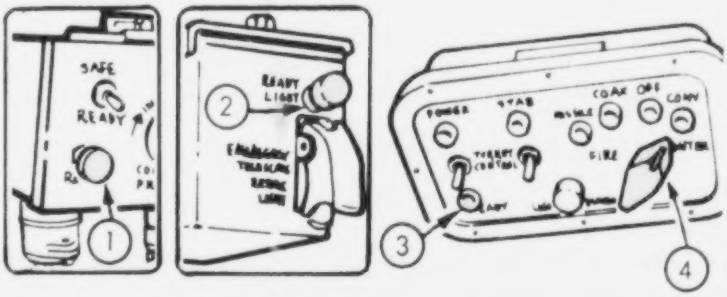
**WARNING: If you can't get a fire, see immediate Action in Case of Failure-to-Fire (paragraph 2-50, step d., starting at d. below.**

2. Once the breech is fully open, place loader's SAFE/READY switch at SAFE (step 6 page 2-109).
3. If you're going to fire another round, check to see if indicator rod is in operating range, make certain ejector lever is still in up (non-eject) position, and load according to paragraph 2-50, steps b. 4. through 7. (starting on page 2-111), and then fire according to paragraph 2-50, steps c. 1. and 2. (starting on page 2-112).

NOTE: Clean the firing probe with nylon scouring pad after every four rounds fired with 24 or 28 volt firing circuit and after every 10 rounds fired with a 120 volt firing circuit. Do not use steel wool as a metallic residue may cause a short and preignition.

d. Immediate Action In Case of Failure-to-Fire.

**WARNING: Keep gun layed on target. Before firing make certain everyone is clear of breech recoil path . . . it'll recoil about 15 inches.**



1. As soon as a failure-to-fire becomes evident the gunner yells "MISFIRE" to alert crew.

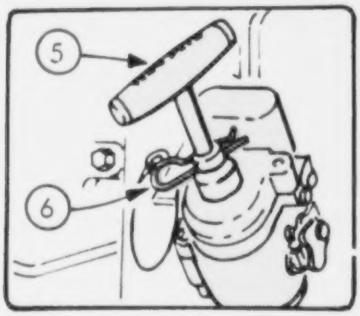
2. Now, recheck - both loader's (1) and gunner's (2) READY lights should be on. TURRET CONTROL READY light (3) should be on and the FIRE CONTROL selector (4) should be at CONV. Also check your safe to fire indicator rod for proper precharge pressure.

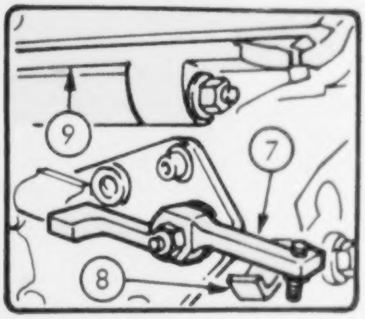
## 2-50. Firing 152-MM Conventional Ammo - continued.

3. With gun on target, announce "ON-THE-WAY," and try to fire using a different trigger (commander's trigger, or gunner's trigger, or trigger on elevation handwheel).

4. If gun does not fire on second try, announce "MISFIRE" and repeat preceding step 3 using yet a different trigger.

**WARNING: Keep safety pin (6) installed on blasting machine (5) and don't turn handle until ready to use. The circuitry from the blasting machine goes directly to firing mechanism, bypassing normal safety circuits.**





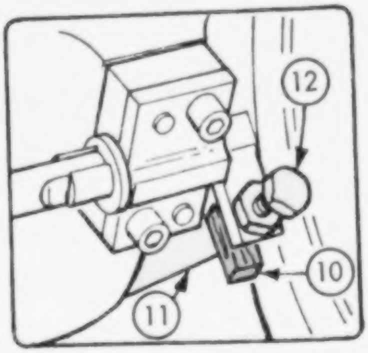
5. With gun still on target, loader tries to fire with blasting machine. Here's how: Remove blasting machine (5) from bracket and get back on your seat (out of recoil). Remove safety pin (6) and announce "ON-THE-WAY." Wait 1 second, then turn handle clockwise 3 times as fast as you can . . . hold handle in final position 2-3 seconds.

6. If still no fire, insert safety pin and return blasting machine to bracket. Set loader's SAFE/READY switch at SAFE. Wait 5 minutes, keeping out of recoil path.

7. With ejector (7) still in up (non-eject) position, open breech.

## 2-50. Firing 152-MM Conventional Ammo - continued.

**NOTE: So that round can be guided out with 2 hands, have another man press and hold detent release handle (8), OR, wedge a small (3/16-inch) piece of wood (10) between detent release plunger (11) and detent setscrew (12).**



8. Press and hold detent release handle (8) and grasp round. Gently slide round back onto loading tray (9) . . . don't let go of handle (8) until round is clear of breech. Remove wedge, if used.

9. Inspect misfire cartridge for presence of initiator. If initiator is missing from cartridge, inspect probe, breech chamber, loading tray and gun tube for initiator. If initiator is still missing, have vehicle commander check and assure that initiator is not in vehicle.

10. Once a round is designated a misfire, replace protective cover and remove round from vehicle. Mark round unserviceable and forward to storage pending disposition by technical agency. No other attempt will be made to fire a round once it has been designated a "misfire."

11. Report misfires, hangfires, and other malfunctions according to applicable regulations and local procedures.

e. After Firing Shutdown.

**WARNING: Make sure the SAFE/READY switch is at SAFE.**

1. Turn FIRE CONTROL selector to OFF.

2. If a round is still chambered, remove according to steps 7 and 8 (paragraph 2-50 d., steps (7) and (8) starting on page 2-115.

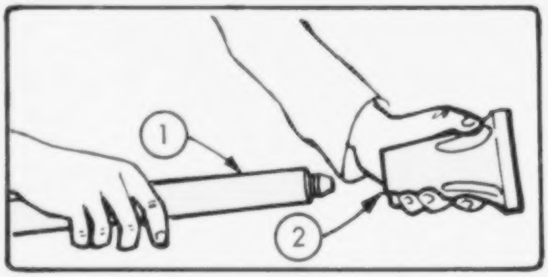
3. Close breech.

**2-50. Firing 152-MM Conventional Ammo - continued.**

4. If you're in stabilized mode, push STAB switch off.
5. Push TURRET CONTROL switch off.
6. Turn CBSS COMPRESSOR switch to OFF and place shutoff valve in off position.
7. Stow your used ballistic covers; wipe off and return the rubber barrier bags to ASP for salvage.
8. Replace muzzle plug.
9. Record number of rounds fired on DA Form 2408-4.

**NOTE: A stuck round can be removed from either the muzzle end (step f below) or the breech end (step g, page 2-118).**

f. Removing Stuck Round From Muzzle End.

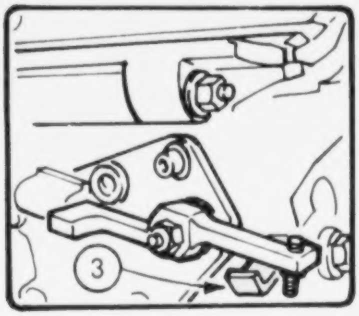


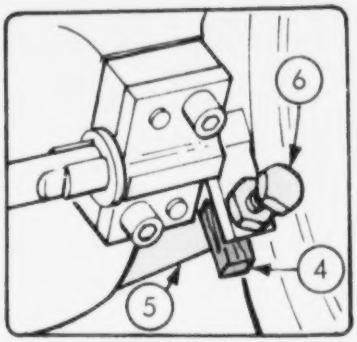
1. Assemble M1 taff sections 1090-00-563-7232 (1) to rammer 1025-00-918-8130 (2).

**WARNING: DO NOT hammer round. Keep your body clear of muzzle as much as possible.**

2. From muzzle, gently slide assembled rammer and staffs down gun bore until seated on ogive (cone) of projectile.

## 2-50. Firing 152-MM Conventional Ammo - continued.

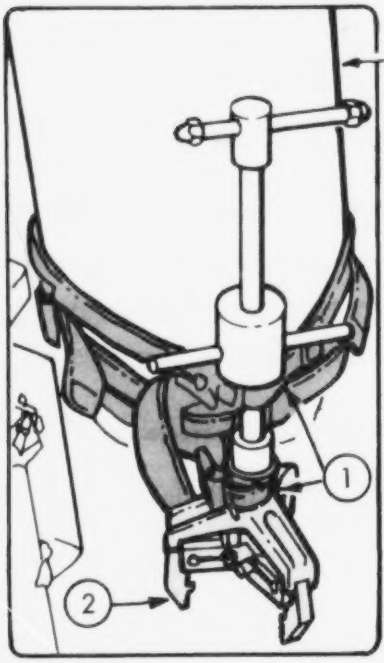




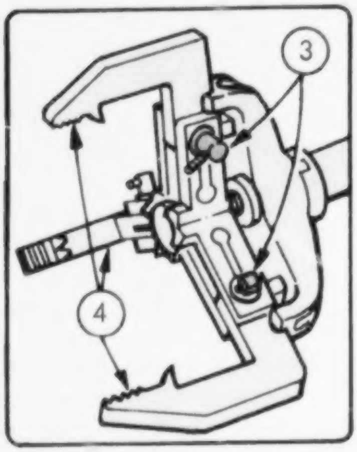
**NOTE: So that round can be guided out with two hands, have another man press and hold detent release handle (3), OR, wedge a small (3/16 inch) piece of wood (4) between detent release plunger (5) and detent setscrew (6).**

3. With breech open, position a man behind breech. Press and hold detent release handle (3) and, while steady pressure is being applied from muzzle end, guide round out onto loading tray. Remove wooden wedge, if used.

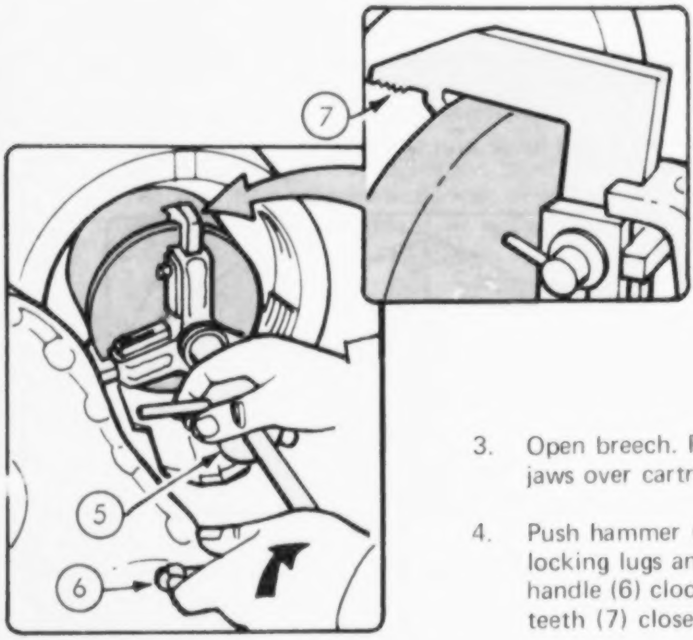
### g. Removing Stuck Round From Breech End.



1. Loosen straps (1) and remove round extractor (2) from stowed position.



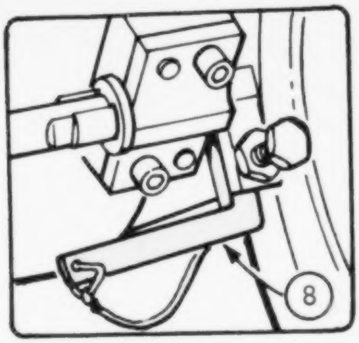
2. Turn pins (3) and extend jaws (4). Turn pins to lock.

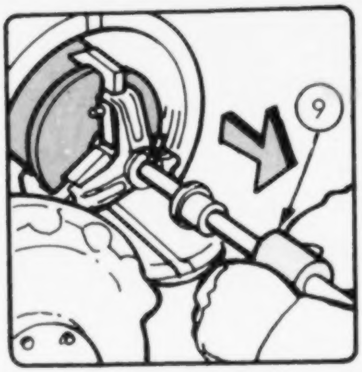


3. Open breech. Position extended jaws over cartridge case.

4. Push hammer (5) forward to engage locking lugs and firmly hold. Turn handle (6) clockwise, until large teeth (7) close behind rim of case.

**2-50. Firing 152-MM Conventional Ammo - continued.**



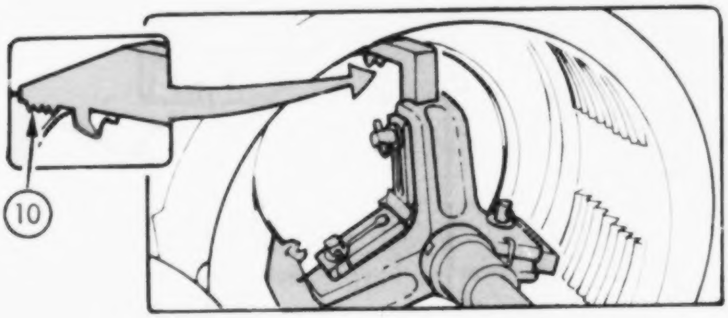


5. Push wedge (8) between detent release plunger and detent setscrew to retract detent. Wedge (8) is your cal .50 MG GO NO-GO fire gage.

6. Slam hammer (9) back to loosen and release projectile.

**NOTE: If case tears loose without releasing the projectile, go on to paragraph 2-50, steps (7) through (12) below.**

7. Remove torn case and loose propellant from vehicle.



8. With jaws extended, position small teeth (10) of jaws over locking ring on projectile boss.

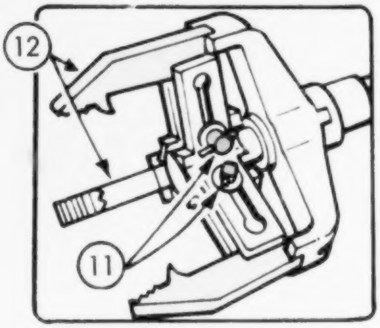
9. Push hammer forward to engage locking lugs. Turn handle clockwise until small teeth are firmly seated.

10. Slam hammer back until projectile is released.

11. Push hammer forward to engage lugs. Turn handle counterclockwise until teeth release grip of projectile. Remove projectile and dispo in accordance with applicable regulations.

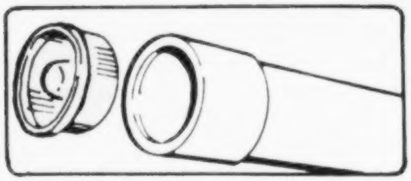
## 2-50. Firing 152-MM Conventional Ammo - continued.

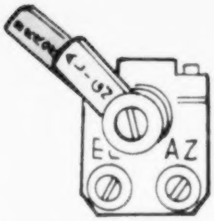
12. Turn pins (11) and retract jaws (12) to stowed position. Strap extractor to rear CBSS cylinder.



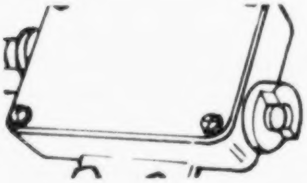
## 2-51. Launching Missile.

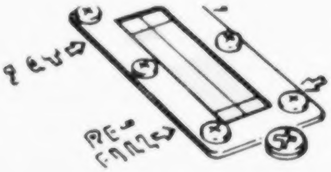
a. Preparation For Launching.





1. Is muzzle plug removed? Is gun tube free of obstructions? Is firing probe of firing mechanism clean of oil? Are ERROR and ALIGN levers, on telescope mount, at full left position?





2. Is indicator rod in operating range? Is reservoir filled with enough hydraulic fluid?

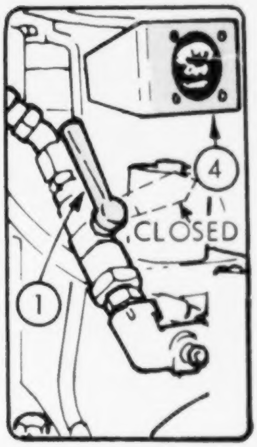
3. Is 7.62-mm machine gun cover closed and locked?

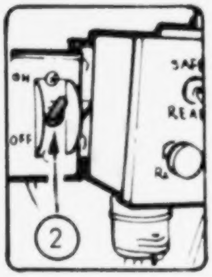
4. Are missiles to be launched in good condition and properly stowed?

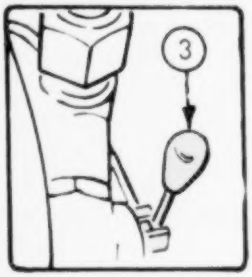
**WARNING: Do not attempt to fire HEAT warhead missiles with dented nose cones.**

**2-51. Launching Missile - continued.**

5. Tell driver to start engine and idle at 1000 to 1300 rpm's. Switch on the turret ventilating fan.





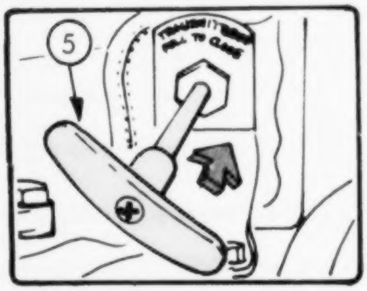


6. Open CBSS shut-off valve (1). Turn COMPRESSOR switch (2) to ON . . . wait until gage reads above 630 psi. Now, with breech closed, trip manual discharge lever (3) for a second to see if scavenger works . . . you'll know it's working if it honks like a horn.

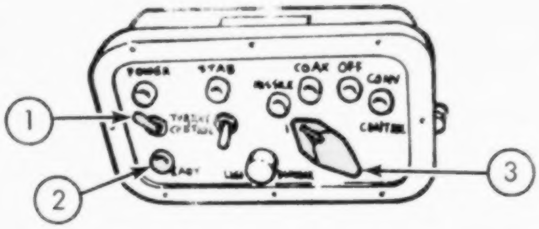
7. Check gage (4). Make sure you have enough pressure to activate the scavenging system.

**WARNING: The compressor automatically shuts down when you're in MISSILE mode. However, it's important that the scavenging system has enough pressure to clean out the gun tube after each firing. Otherwise, an after-firing flareback can occur . . . and, with all those "flammables" in the turret, this could spell T-R-O-U-B-L-E.**

8. Open transmitter door by turning control handle (5) counterclockwise and pushing forward. Lock door open by turning handle an eighth of a turn clockwise.



b. Loading.

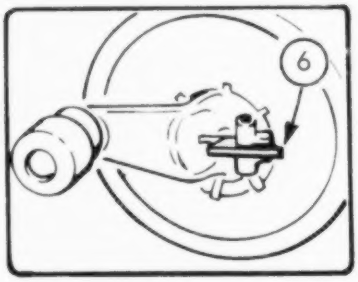

POWER
STAB
COAX
OFF
MISSILE
CONV
TURRET CONTROL
CONTROL
RDY
1
2
3

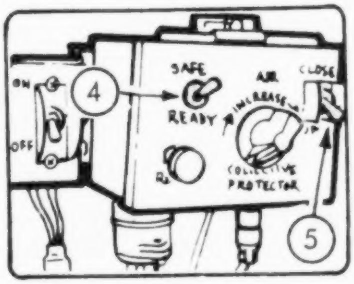
1. Push up on TURRET CONTROL switch (1). Wait about 20 seconds until READY light (2) comes on, then turn FIRE CONTROL selector (3) to MISSILE.

**NOTE: Once you turn to MISSILE, the PRIME VOLTAGE and POWER SUPPLY lamps on your test set panel will blink. But don't worry, once the system warms up, the lights will go out. Also, a missile reticle will appear in the telescope . . . check to make sure.**

2. At loader's control box make sure SAFE/READY switch (4) is at SAFE.

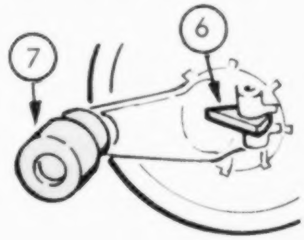
3. Open breech:




ON
OFF
4
SAFE
READY
AIR
INCREASE
CLOSE
OP
COLLECTIVE
PROTECTOR
5

(a) Electrically: Snap locking lever (6) into one of eight slots in rear cover. Hold down CLOSE/OPEN switch (5) until breech is fully opened.

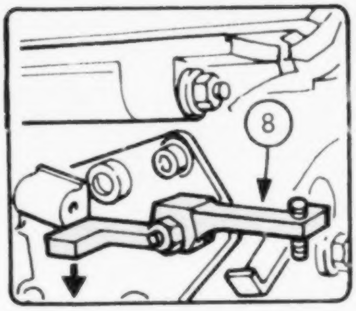
(b) Manually: Snap locking lever (6) into spindle slot. Turn handle (7) counterclockwise until breech is fully opened.

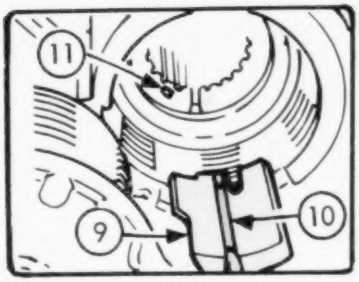


## 2-51. Launching Missile - continued.

4. Place ejector lever (8) in down (eject) position.

5. Remove missile from stowage rack.



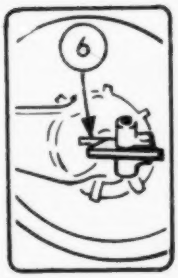


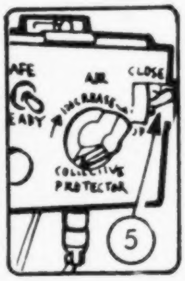
6. Place missile on loading tray (9) so that missile index key slides in slot (10). Shove firmly into tube until detent pin (11) is engaged.

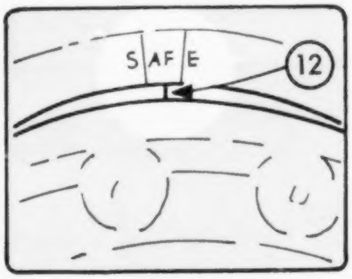
**WARNING: Do not attempt to launch HEAT warhead missile with dented nose cone.**

7. Close breech:

   (a) Electrically: With locking lever (6) in one of eight slots in rear cover, hold up on CLOSE/OPEN switch (5) until breech is fully closed. It's fully closed when breech scribe mark (12) is within the two coupling marks.



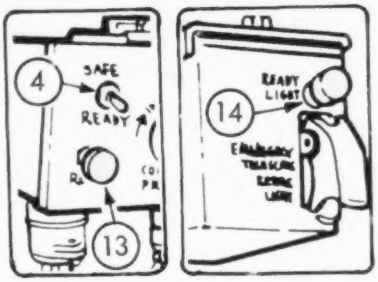




   (b) Manually: With locking lever in spindle slot, turn handle clockwise until breech is fully closed. Snap actuator lever back into one of the eight slots.

**WARNING:** Snapping locking ever into one of eight slots frees handle from spinning once gun is fired and breech automatically opens. If you don't do this, you might get hit by the spinning handle.

8. At loader's control box, place SAFE/READY switch (4) at READY. Both the loader's (13) and gunner's (14) READY lamps should light. Once they do, you're ready to fire.



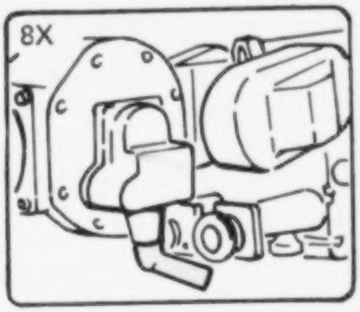
**WARNING:** If ready lamps don't light, make sure breech is fully closed (step 7). Check scribe mark (12) from side of breech keeping out of recoil path in case of a premature fire.

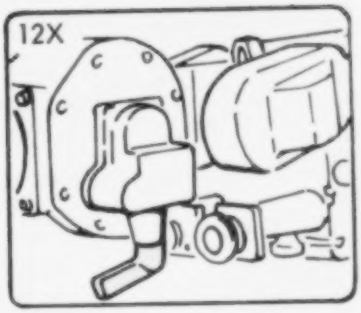
c. Launching.

**WARNING:** Before firing, make certain everyone is clear of the breech recoil path . . . it'll recoil back about 5 inches.

**CAUTION:** Make sure cover is closed on 7.62-mm machine gun before firing main gun. Before closing cover, be sure cover latch rods are forward as cover will not lock if rods are to rear.

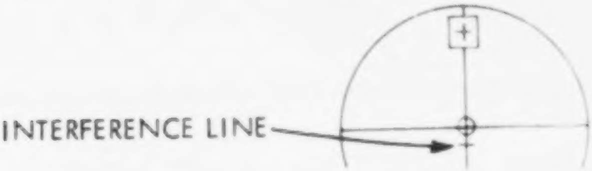
**NOTE:** Stop vehicle before launching missile . . . this'll give you the stable position needed to guide missile on target.



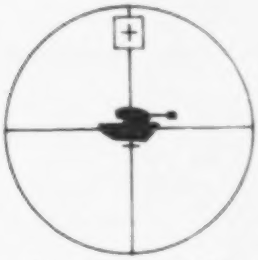


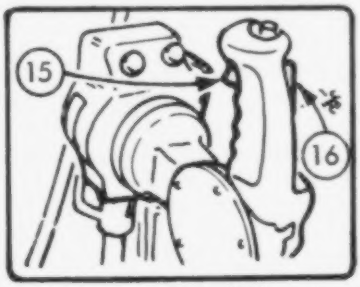
NOTE: If you're firing at medium or extended ranges or in hazy light conditions, switch to 12 power. If you've got good daylight vision or short range, switch to 8 power.

NOTE: View through gunner's telescope. Don't fire IF: terrain obstacles are above interference line of missile reticle, OR these obstacles are directly in line-of-sight, OR these obstacles are within 500 meters of vehicle, OR transmitter line-of-sight is blocked. Avoid these IF's . . . move vehicle and fire from a different position.



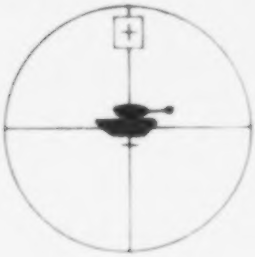
NOTE: Missile can be launched electrically, step 1. below or manually, step 2. following.

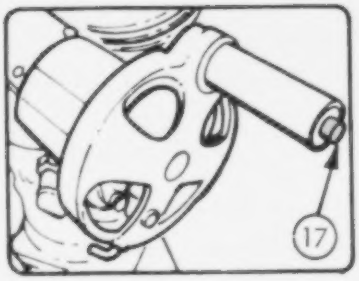




1. Launching Electrically. Press the palm switch (16) and establish target in center crosspoint of missile reticle, as illustrated. Continue tracking tar and press trigger (15). It will take a second or so before missile launch DON'T release the trigger until missile launches. Continue tracking tar until missile impact. DON'T try to track the missile; if you do, you will never hit the target.

## 2-51. Launching Missile - continued.





2. Launching Manually. With target in center crosspoint of missile reticle, press firing button (17) on elevation handwheel. It'll take a second or so before missile fires. Keep tracking target with manual controls, keeping target in center crosspoint of reticle until missile impact. DON'T track the missile.

WARNING: If you don't get a fire, follow paragraph 2-51, step e. (starting on page 2-129), Missile - Immediate Action in Case of Failure-to-Fire.

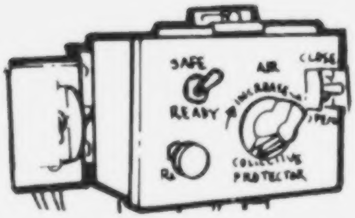
CAUTION: Don't load another missile until gunner indicates hit-miss-or ground. The loading vibrations could hinder the gunner's tracking.

NOTE: The commander can also launch the missile by pressing his palm switch (this electrically overrides the gunner's control) and then pressing the trigger. However, since the commander cannot accurately track the target, he should not launch missiles except in extreme cases.

NOTE: When you launch a missile, here's what happens at recoil . . . the ventilating fan turns off, the gun recoils about 5 inches, then returns to battery. Now, the scavenging system blows out gases and debris (you'll hear a sound like a foghorn for about 2 seconds). Next, the breech opens automatically and the missile aft cap pops out; and last, the ventilating fan turns back on.

## 2-51. Launching Missile - continued.

3. Once the breech is fully open, place loader's SAFE/READY switch at SAFE.



**WARNING: Before launching another missile check CBSS gage. Gage should read about 650 psi or more.**

4. If you're going to launch another missile, check CBSS gage, check to see if safe-to-fire indicator rod is in operating range, check to see if ejector lever is still in down (eject) position, then load and launch according to preceding steps b. 3. through 8. and c. 1. and 2. (starting on page 2-123).

d. After Launching Shutdown.

**WARNING: Make sure SAFE/READY switch is at SAFE.**

1. Turn FIRE CONTROL selector to OFF.
2. If a missile is still chambered, remove according to paragraph 2-51. e. steps 3. and 4. (on page 2-130).
3. Close breech.
4. Push TURRET CONTROL switch to OFF.
5. Turn CBSS COMPRESSOR switch to OFF and place shutoff valve in off position.
6. Remove spent missile aft caps from turret.

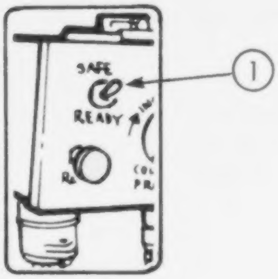
**2-51. Launching Missile - continued.**

e. Immediate Action In Case of Failure-to-Fire.

**WARNING: Keep gun layed on target. Make certain everyone is clear of breech recoil path . . . it'll recoil back about 5 inches.**

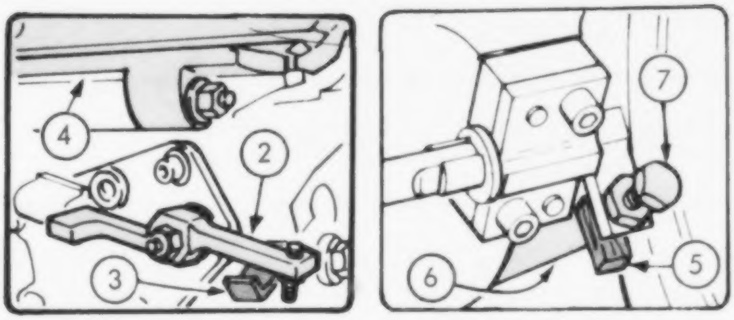
1. As soon as a failure-to-fire becomes evident the gunner hollers "MISFIRE" to alert crew.

**WARNING: After a misfire DO NOT make a second attempt to launch the misfired missile. It is highly probable that another attempt to launch will result in an uncontrolled missile flight.**



2. Place loader's SAFE/READY switch (1) at SAFE. Wait at least 10 minutes, keeping out of recoil path (this wait can be reduced to 4 minutes under combat conditions).

## 2-51. Launching Missile - continued.



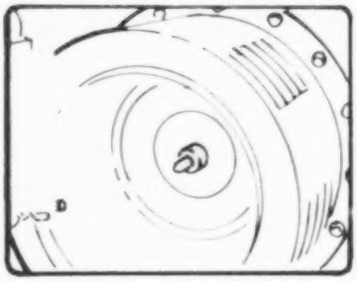
3. Place ejector (2) in up (non-eject) position; open breech.

**CAUTION: Ejector must be up. Otherwise, the ejector will damage the missile as it tries to eject.**

**NOTE: So that round can be guided out with 2 hands, have another man press and hold detent release handle (3), OR, wedge a small (3/16-inch) piece of wood (5) between detent release plunger (6) and detent setscrew (7).**

4. Press in and hold detent release handle (3) and grasp missile. Gently slide round back onto loading tray (4) . . . don't let go of handle (3) until round is clear of breech. Remove wedge, if used.

**NOTE: In combat situations, dispose of missile immediately. In non-combat situations cover aft end of missile with two layers of aluminum foil. Extend over rim of aft cap and secure foil. Tag missile with: "CAUTION: MISFIRED MISSILE, HANDLE WITH CAUTION." Place missile in missile container and tag outside of container with same caution. Evacuate thru normal ammunition supply channels.**

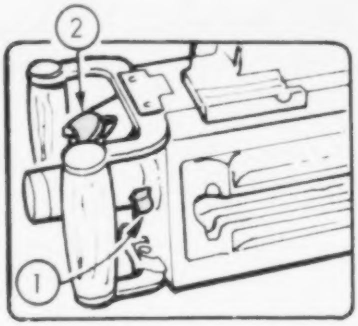


5. Before resuming fire, clean firing probe of firing mechanism with nylon scouring pad. Check continuity of firing circuit
6. Report misfires, hangfires, and other malfunctions according to applicable regulations and local procedures.

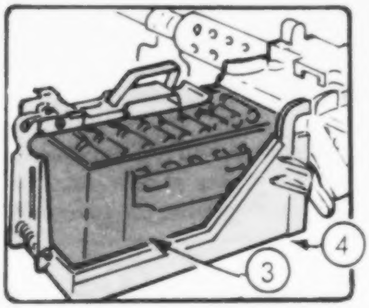
## 2-52. Operating Cal. 50 Machine Gun.

a. Preparation For Firing Cal .50 Machine Gun.

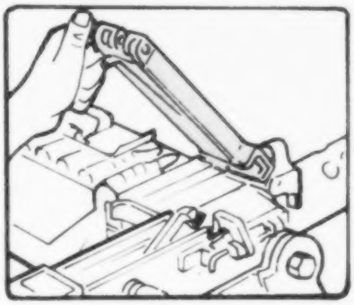
1. Install carrier assembly (page 3-105).
2. Install flash hider (page 3-105).
3. Check and adjust headspace and timing (page 3-99).



4. If you're going to give it to 'em one at a time, turn lock (1) clockwise to raise bolt release (2). If you want to spray the target, press down on bolt latch release (2) and turn lock (1) counterclockwise.

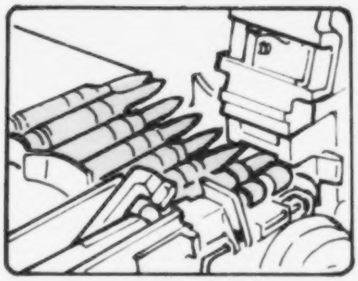


5. Remove ammo box cover and place box (3) in ammo tray (4). Double loop end of ammo belt must be leading.

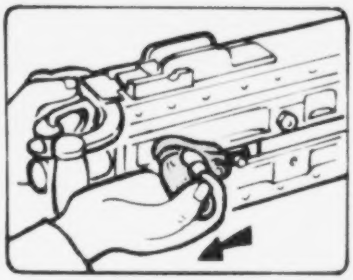


6. Raise cover.

**2-52. Operating Cal .50 Machine Gun - continued.**

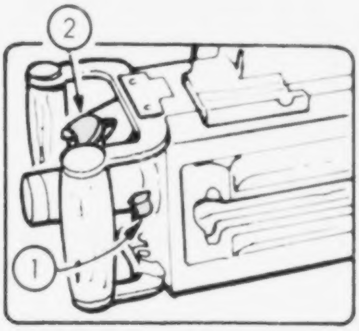


7. Insert double loop end of ammo in feedway until first round is held by holding pawl. Close cover.



8. Half-load gun by pulling the retracting slide handle all the way back and push to the front.

b. Firing Cal .50 Machine Gun

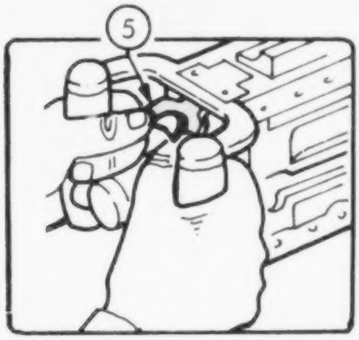


1. Position lock (1) to engage bolt latch release (2). When release is depressed, bolt will go forward.

2. Gun is now half loaded; to fully load, repeat preceding step a. (8).

3. To fire semi-automatically, place bolt latch release (2) in the up position (not locked down), press trigger (5) to fire.

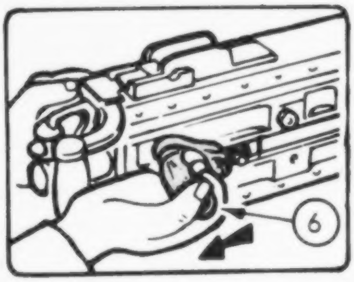
4. To fire automatically, place bolt latch release in the down (locked) position, press trigger (5) to fire. OR, if you're at semi-automatic, press down both the trigger and bolt latch release for automatic fire.



## 2-52. Operating Cal .50 Machine Gun - continued.

c. Unloading.

1. Raise cover and lift ammo away from weapon, close cover.



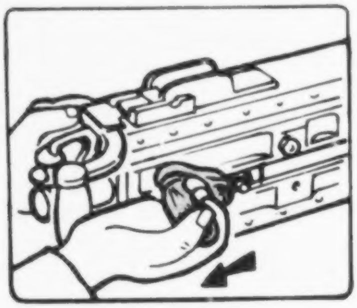
2. Pull retracting slide handle (6) back where it will be held by bolt latch.

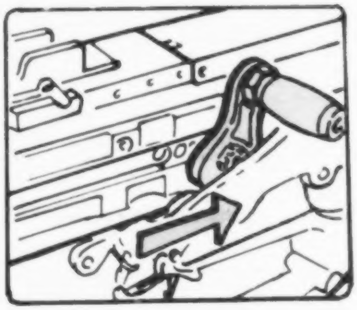
3. Open cover, check chamber and T-slot. If rounds are present, release handle and pull back until all cartridges are removed.

4. Release bolt by depressing bolt latch, ease bolt forward with retracting slide handle, press trigger, close cover.

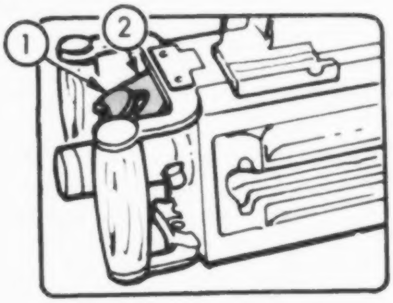
d. Immediate Action In Case of Failure-To-Fire Machine Gun.

1. If the machine gun is cool, less than 150 rounds fired within 2 minutes:





(a) Retract bolt and push slide handle forward.



(b) Depress bolt latch release (1) to return bolt forward.

(c) Depress trigger (2).

## 2-52. Operating Cal .50 Machine Gun - continued.

(d) If gun doesn't fire, wait 5 seconds, retract bolt (bolt latch release (1) must be up), and return handle forward.

(e) Unload gun (see preceding page c. 1).

(f) Troubleshoot to determine cause of stoppage (starting on page 3-45).

**WARNING: Because of the possibility of a cook-off, NEVER OPEN THE COVER to try to remove a round chambered in a very hot barrel.**

2. If the machine gun is hot, more than 150 rounds fired within 2 minutes:

   (a) Stay clear of breech; keep gun on target.

   (b) Charge weapon to the rear position; leave cover closed.

   (c) Keep gun on target and pointed down range; evacuate area for 15 minutes to allow for a possible cook-off.

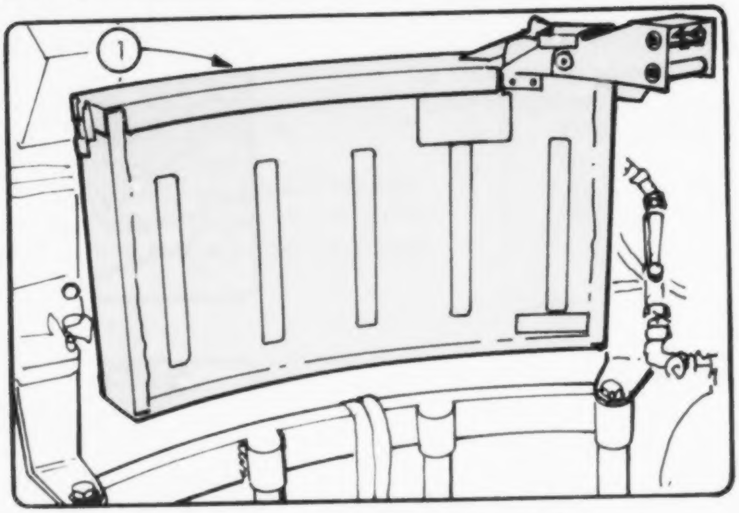
   (d) After 15 minutes wait, unload gun and troubleshoot to determine cause of stoppage. (starting on page 3-46).

## 2-53. Operating 7.62-MM Machine Gun.

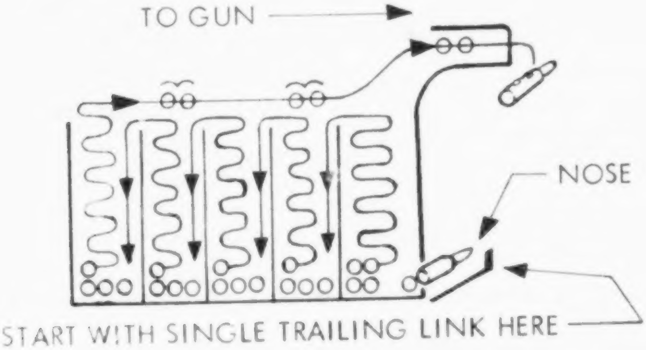
WARNING: Make sure the cover is latched shut on your 7.62-mm machine gun before firing main gun.

a. Preparation For Firing 7.62-mm Machine Gun.

1. Insure machine gun is aligned with gun/launcher and zeroed.
2. Tell driver to turn on MASTER SWITCH.
3 Make certain FIRE CONTROL selector is at OFF.

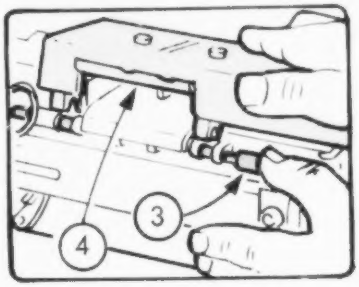


4. At ammo box, unhinge and remove door (1).



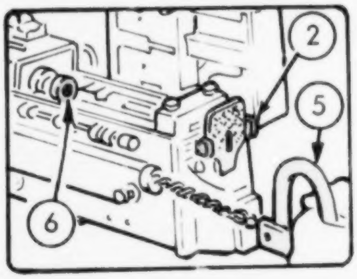
5. Start laying ammo in forward compartment with a single trailing link and nose of ammo facing turret wall. Lay ammo slightly above dividers and continue to the next compartment. After last compartment is filled, run belted ammo forward through feed chute . . . and on to machine gun. Replace door and lock with hinge.

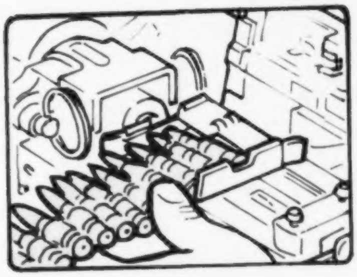
6. Slide safety (2) page 2-136 to "S" (safe), push forward on latch rod (3) and raise cover (4).

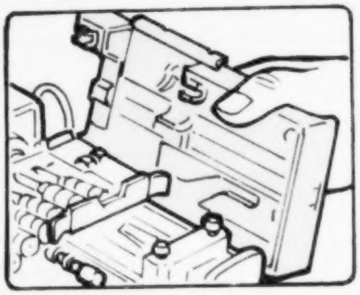


## 2-53. Operating 7.62-MM Machine Gun - continued.

7. Slide safety (2) to "F" (fire), pull handle (5) rearward to cock machine gun. Inspect chamber (6).







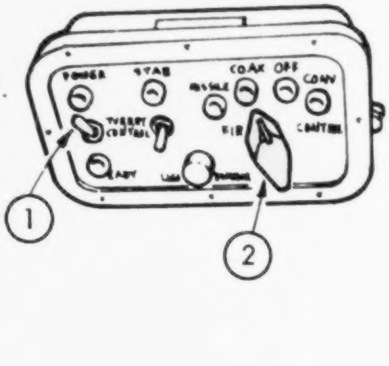
8. Place first round of ammo belt in slot of feed tray with open end of link loops facing down.

9. With latch rod lock engaged forward, close cover.

b. Firing 7.62-mm Machine Gun.

**WARNING: Turret ventilating fan must be on. Without fan, toxic gases could reach dangerous level.**

1. Turn TURRET CONTROL switch (1) on. Turn FIRE CONTROL selector (2) to COAX. Slide machine gun safety (3) to "F" page 2-137.


POWER
STAB
MISSILE
COAX
OFF
CONV
TURRET CONTROL
FIRE
CONTROL
1
2

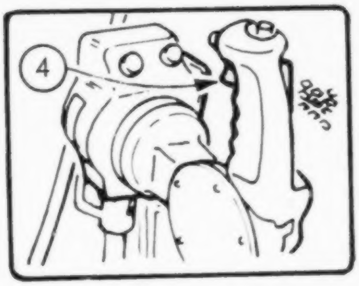
## 2-53. Operating 7.62-MM Machine Gun - continued.

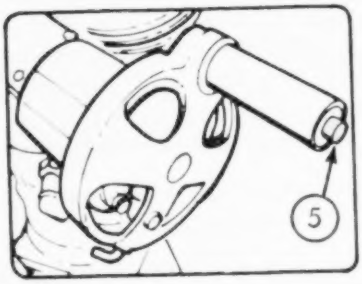
2. Fire Gun:

   (a) Gunner presses trigger on control handle (4).

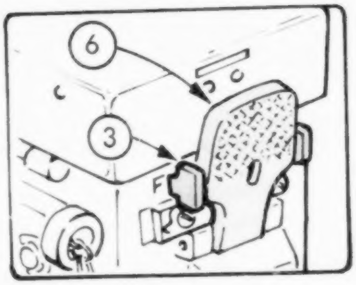
   OR

   (b) Commander presses his palm switch to override the gunner and then squeezes his trigger.





   (c) If operating turret manually, gunner presses button on elevation handwheel (5) to fire weapon.



   (d) Loader can fire manually by pressing firing trigger (6) on gun.

c. Stopping Runaway Gun. If gun continues firing after all firing buttons are released:

1. Pull and hold charging handle to rear to stop firing. Keep machine gun on target until it stops firing.

2. Slide safety (3) to S. Open cover and remove ammo.

3. Check that chamber is clear.

4. See troubleshooting (starting on page 3-43) to correct cause.

d. Immediate Action In Case of Misfire.

1. If machine gun is cool, less than 200 rounds fired within 2 minutes:

   (a) Wait 5 seconds in case of hangfire, keep gun on target.

   (b) Charge machine gun and attempt to fire again.

(c) If gun doesn't fire, charge again and slide safety to S.

(d) Open cover and remove ammo and check chamber.

(e) Slide safety to F and hand function one complete cycle. Return safety to S.

(f) Reload.

(g) Slide safety to F and try to fire weapon. If gun doesn't fire, see troubleshooting procedures.

2. If machine gun is hot, 200 rounds have been fired within 2 minutes:

**WARNING: Because of the possibility of a cookoff never try to remove a round that is chambered in a very hot barrel.**

3. Keep gun on target.

4. Wait 15 minutes, then unload gun and troubleshoot to determine cause of stoppage (starting on page 3-43).

e. Unloading 7.62-mm Machine Gun.

1. Place safety to F and charge machine gun. Slide safety to S.

2. Push forward on latch rod and raise cover.

3. Remove ammo belt from machine gun, raise feed tray and check that chamber is clear.

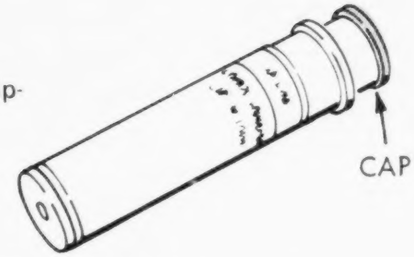
4. Slide safety to F and pull charging handle rearward. Press manual firing trigger and allow handle to go forward slowly under control of the charger handle.

5. Slide Safety to S and close cover.

## 2-54. Operating Grenade Launcher, M176.

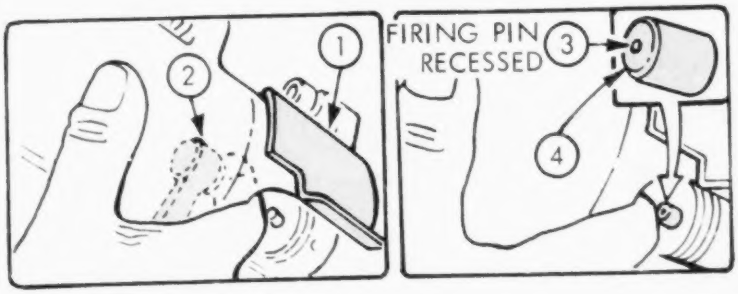
a. Inspecting and Loading.

1. Remove grenade launchers from shipping containers.



**WARNING: Don't try to disassemble grenade launchers . . . handle with care. If launchers have external cracks, dents, or other deformities, don't use. Notify explosive ordnance disposal (EOD).**

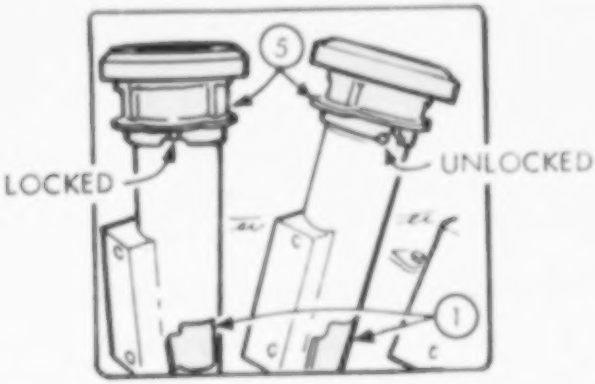
2. Remove any spent launchers from launcher tube assemblies.



3. At each launcher tube, slide back inspection cover (1) and lift up solenoid guard (2). Inspect for foreign matter around firing pin (3). Close cover.

**WARNING: Make certain firing pin does not extend above pin seat (4). If it does, push it back down. You could get a premature fire when loading grenade launcher.**

## 2-54. Operating Grenade Launcher, M176 - continued.


5
LOCKED
UNLOCKED
1

4. Lift up and turn locking ring (5) at each tube.

ON
SALVO
LEFT
RIGHT
SALVO

**WARNING: Before loading grenade launchers, make sure FIRE switch is safety pinned and MASTER switch is safety wired.**

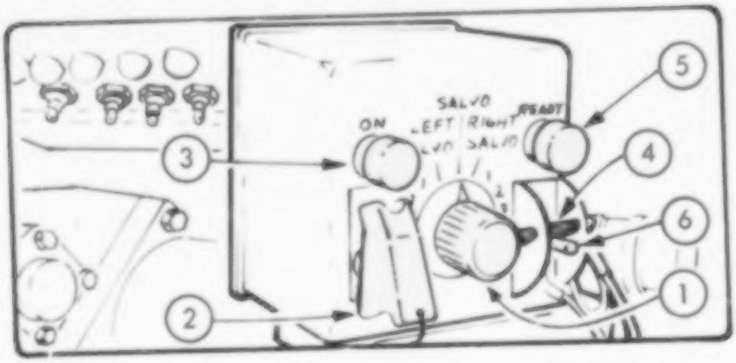
5. Place grenade launchers in tubes and turn rings to locked position.

b. Firing.

**WARNING: Make certain all personnel are at least 100 meters to rear of direction-of-fire.**

# 2-54. Operating Grenade Launcher, M176 - continued.

1. Secure all hatches.



2. Determine SALVO or individual launcher to be fired and turn selector knob (1) to this position.

3. With vehicle MASTER switch on, remove seal from guard (2) and push MASTER switch up . . . ON lamp (3) will light.

4. Pull out safety pin (4); again check for personnel in the area.

5. When READY lamp (5) comes on push up on FIRE switch (6) to launch grenade(s).

**WARNING: If you don't get a fire, see procedure c., Immediate Action In Case of Failure-To-Fire (starting on page 2-142).**

**WARNING: Always remove unfired launchers after each mission. Follow steps 6. thru 7. in exact order.**

6. After firing, secure FIRE switch (6) with safety pin (4).

7. Turn MASTER switch to OFF and place guard (2) over switch.

## 2-54. Operating Grenade Launcher, M176 - continued.

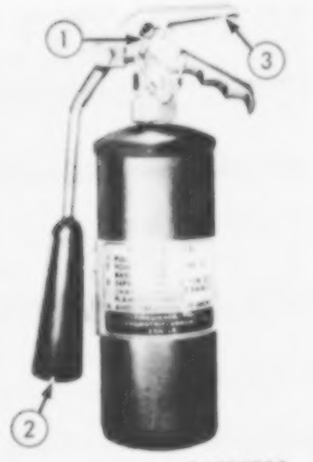
8. Lift up locking rings on tube assemblies and turn to unlock.
9. Remove unfired launchers from tube assemblies and store as live ammo.

c. Immediate Action In Case Of Failure-to-Fire.

1. After first unsuccessful attempt to fire, wait 10 seconds and fire again. If you still get no results, wait 4 more seconds and fire again.
2. If you still have a failure-to-fire after third try, secure FIRE switch with safety pin. Turn MASTER switch to OFF and place guard over switch.
3. Stay buttoned-up in the vehicle for at least 15 minutes.
4. Lift up locking rings on tube assemblies and turn to unlock.
5. Remove launchers and notify EOD personnel.
6. Have organizational maintenance perform continuity check of grenade launchers.

## 2-55. Operating Portable Fire Extinguisher.

**WARNING: Do not breathe smoke.**



**NOTE: The fire extinguisher is mounted in turret.**

a. Pull ring pin (1).

b. Point horn (2) at base of fire.

c. Depress trigger (3) for discharge.

d. Keep base of flames covered.

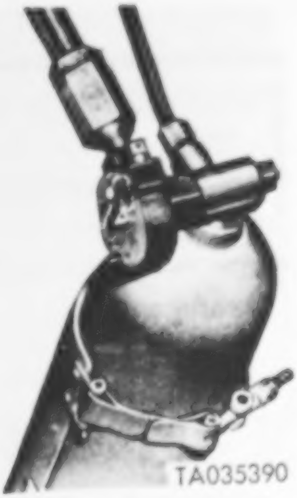
e. After operation, see organizational maintenance for refill.

## 2-56. Operating Engine And Crew Compartments Fire Extinguishers.

WARNING: Do not breathe smoke.

WARNING: Crew must evacuate vehicle after extinguishers are set off.

WARNING: Engine must be stopped for extinguisher agent to be effective.



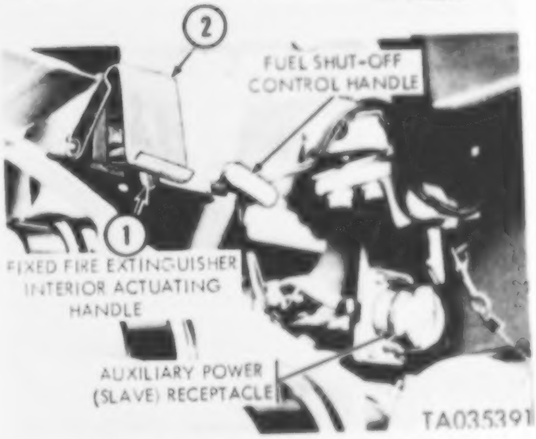
Engine Compartment Fire Extinguisher

NOTE: Driver's actuating handle (1) sets off both the engine and crew compartment fire extinguishers, and automatically shuts off fuel to engine.

a. Before pulling handle (1), tell turret crew to get out.

b. Place MASTER SWITCH in OFF position. Pull FUEL SHUT OFF control handle to ''kill'' engine. Lift shield (2), pull handle (1). Get out of vehicle and follow turret crew.

c. After operation, see organizational maintenance.


2
FUEL SHUT-OFF CONTROL HANDLE
1
FIXED FIRE EXTINGUISHER INTERIOR ACTUATING HANDLE
AUXILIARY POWER (SLAVE) RECEPTACLE
TA035391

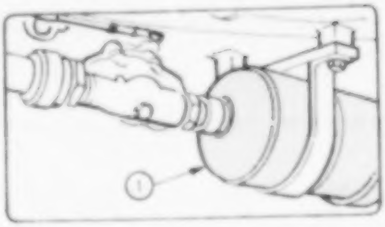
Driver's Actuating Handle For Engine And Crew Compartment Fire Extinguishers

NOTE: Exterior actuating handle (paragraph 2-58, page 2-145), sets off both engine and crew compartment fire extinguishers, but does not shut off fuel to the engine.

## 2-57. Operating Crew Compartment Fire Extinguisher.

**WARNING:** Do not breathe smoke.

**WARNING:** Crew must not remain in vehicle after extinguisher is set off.



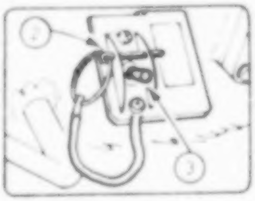
Crew Compartment Fire Extinguisher Mounted On Hull (Behind Driver)

**CAUTION:** This extinguisher is to be used only to put out crew compartment fires.

a. The extinguisher is set off at commander's station.

b. Tell turret crew to get out of vehicle. Traverse gun 90 mils left or right to clear driver's hatch.

c. Tell driver to pull FUEL SHUT OFF control handle to "kill" engine.



Commander's Switch in Turret

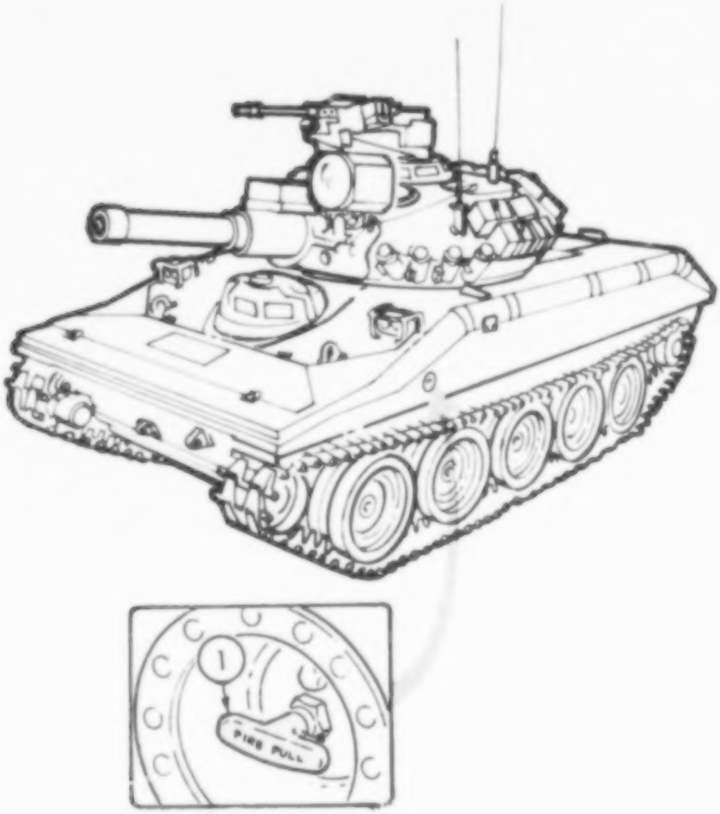
d. Pull out safety ring pin (2) and push up on switch (3). Tell driver to place MASTER SWITCH in OFF position. Driver and commander get out of and away from the vehicle.

e. After operation, see organizational maintenance for refill and maintenance.

**NOTE:** Exterior actuating handle (paragraph 2-58, page 2-145), sets off both crew and engine compartment fire extinguishers, but does not shut off fuel to the engine.

## 2-58. Operating Exterior Actuating Handle For Crew and Engine Compartment Fire Extinguishers.

CAUTION: Exterior actuating handle (1) sets off both crew and engine compartment fire extinguishers, but does not shut off fuel to the engine.



a. Get crew out of vehicle and stand clear.

b. You pull handle (1), then . . .

c. Move away from vehicle.

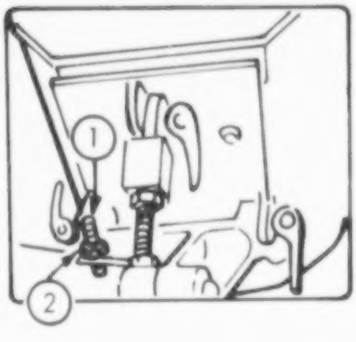
d. After operation, see organizational maintenance for refills and maintenance.

# Section III. OPERATION OF AUXILIARY EQUIPMENT

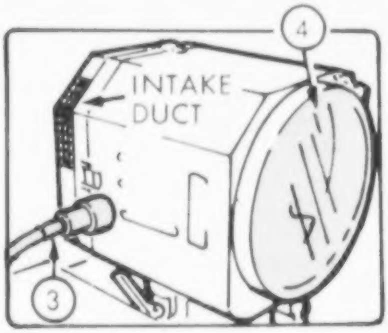
## 2-59. Operating Searchlight AN/VSS-3 or AN/VSS-3A.

a. Preliminary Procedure.

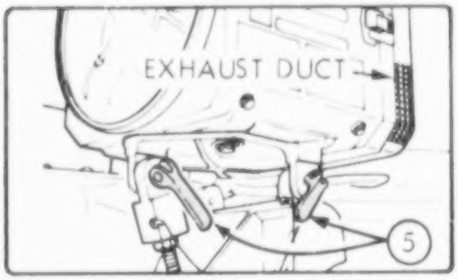
1. Remove cover from searchlight and stow.



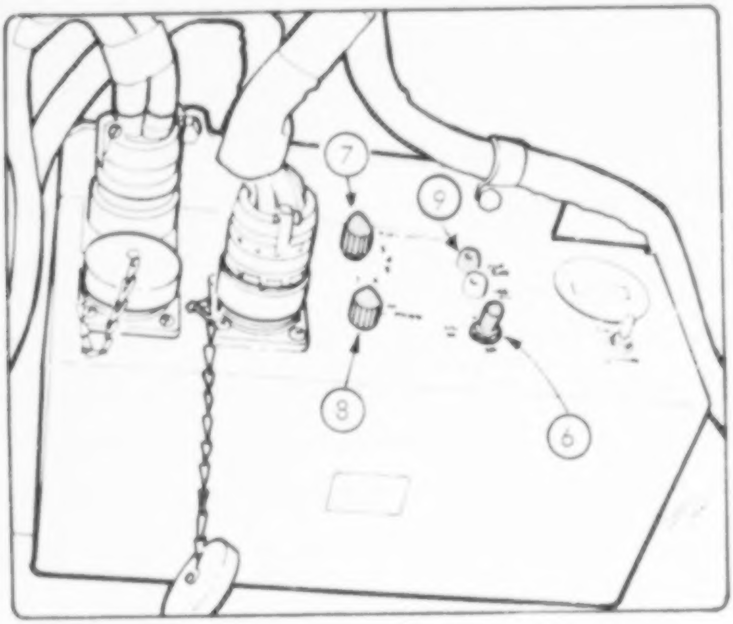
2. Insure jack screw (1) is in firm contact with gun shield and jam nut (2) is tight against mounting bracket.



3. Insure intake and exhaust ducts are free of dirt and debris, power cable (3) is firmly connected, and window (4) is clean.



4. Check the three pin handles (5). They must be in locked (down) position.



5. At control box AN/VSS-3, check the following:

   (a) VISIBLE/INFRARED/OFF switch (6) at OFF.

   (b) Circuit test switch (7) at OPERATING POSITION.

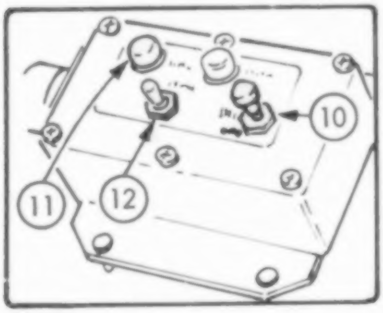
   (c) LOCAL/REMOTE switch (8) at either LOCAL (if you're going to operate at control box) or REMOTE (if you're going to operate at the remote box).

**WARNING:** Make certain all personnel are out of the path of searchlight beam. Temporary flash blindness can occur at ranges up to 320 meters.

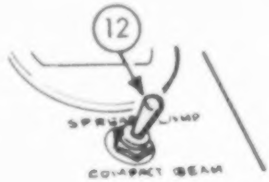
**WARNING:** Do not look directly into the searchlight beam. Blindness or serious eye damage may develop.

**CAUTION: DO NOT** operate searchlight with vehicle engine off.

6. Have driver start engine and hold at fast idle (1000 to 1300 rpm's).



**NOTE:** Remote control box allows commander to operate searchlight. The following instructions apply to either main or remote control box.



b. Operating Procedure

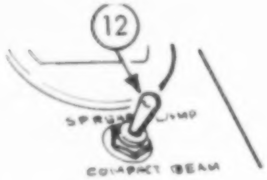
1. Pull out on VISIBLE/INFRARED/OFF switch (10) and set at either VISIBLE or INFRARED. LAMP ON will light and, in about 3 seconds, the searchlight should ignite . . . if not, turn off and turn on again. If needed, repeat the off/on procedure 5 or 6 times. If the searchlight still doesn't come on, see troubleshooting (starting on page 3-49).

**CAUTION: Check OVER TEMP lamp (11) after searchlight has been on 1 minute, and frequently afterwards. If lamp lights, turn off searchlight . . . it's overheated.**

## 2-59. Operating Searchlight AN/VSS-3 or AN/VSS-3A - continued.

2. Setting BEAM switch (12) to:

   (a) COMPACT - for narrowest searchlight beam . . . about 1° in width.



   (b) SPREAD - and hold setting - for a searchlight beam spread from 1° to 7° to width. It takes about 2 seconds before beam gets to 7°, but you can get any beam width in between by letting go of switch.

**NOTE: If you want a narrower beam you'll have to switch to COMPACT and then back to SPREAD and hold until you get the beam width desired.**

c. After Operating Searchlight.

1. Pull VISIBLE/INFRARED/OFF switch out and set at OFF . . . the searchlight will go out. If you've been operating more than 5 minutes, the blower will stay on until searchlight cools. The only 2 places to turn off searchlight are . . . the control box or remote box.

**WARNING: Keep vehicle engine running until blower stops. If you don't, lamp could explode.**

2. After blower shuts off, tell driver to turn off engine. Then, at control box, check the following:

   (a) VISIBLE/INFRARED/OFF switch at OFF.

   (b) Circuit test switch at OPERATING POSITION.

   (c) LOCAL/REMOTE switch at LOCAL.

**CAUTION: If searchlight has been on for any length of time, it'll be hot and you'll have to wear asbestos mittens to install cover.**

3. Install searchlight cover.

## 2-59. Operating Searchlight AN/VSS-3 or AN/VSS-3A - continued.

d. Boresighting Searchlight at 1200 Meters.

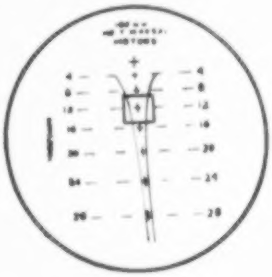
> **WARNING:** Do not look into searchlight beam. Blindness or serious eye damage could result.

**NOTE: At 1200 meters, you'll have to boresight at night. If you want to boresight during the day you'll have to boresight at 10 meters, paragraph 2-59, e. (starting on page 2-152).**

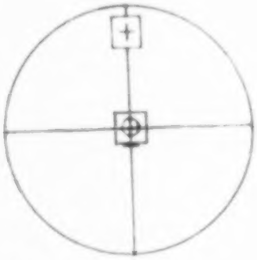
**NOTE: To boresight with CONV reticle, preliminary boresighting must be performed, telescope boresighted and established, or emergency zero applied to telescope to proceed.**

**To boresight with MISSILE reticle, preliminary boresighting must be performed, telescope boresighted, and tracker alignment test performed.**

1. Tell driver to start engine and hold at fast idle (1000 to 1300 rpm).
2. Turn on searchlight . . . to either visible or infrared. Select a target (preferably a boresight panel).
3. To boresight using CONV reticle - with FIRE CONTROL selector at CONV, look through telescope and traverse turret and elevate/depress gun until 1200 meter mark cross is layed on center of target.

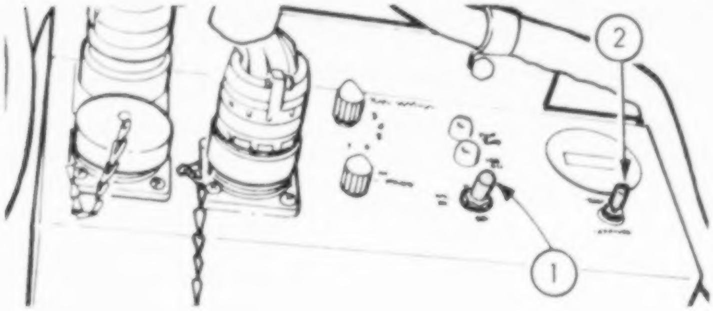


4. To boresight using MISSILE reticle - with FIRE CONTROL selector at MISSILE, look through telescope and traverse turret and elevate/depress gun until aiming cross is layed on center of target.

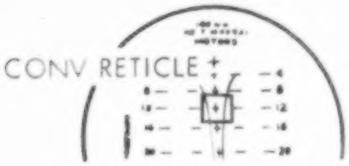


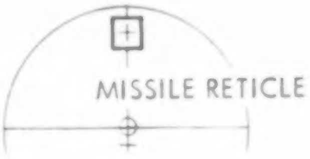
**NOTE: The following instructions pertaining to searchlight controls, apply to either main or remote control boxes. (Main control box of AN/VSS-3 is illustrated, next page).**

## 2-59. Operating Searchlight AN/VSS-3 or AN/VSS-3A - continued.

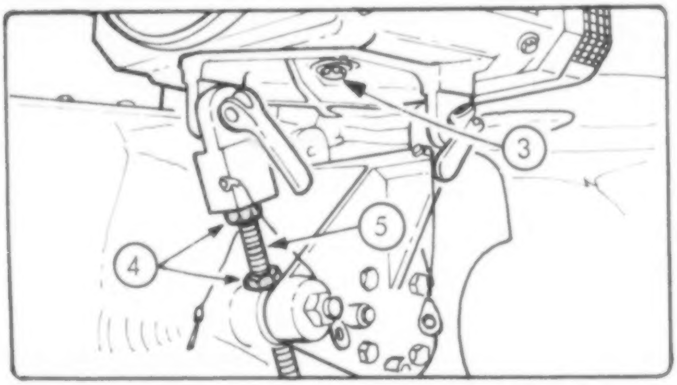


5. With VISIBLE/INFRARED/OFF switch (1) at VISIBLE, set SPREAD/COMPACT BEAM switch (2) at COMPACT.





6. Check beam on target. Maximum intensity of beam should be at horizontal and vertical center of target. If searchlight needs a horizontal adjustment, see step 7. next page; if a vertical adjustment is needed, see step 8. next page.



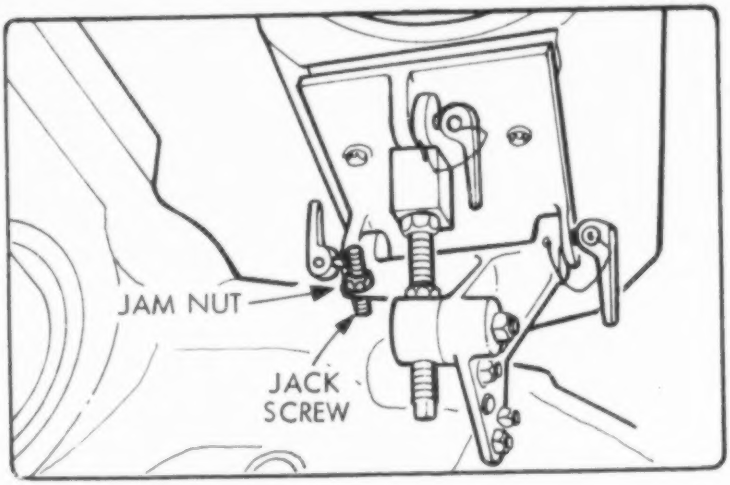
**CAUTION: Turn searchlight off before making adjustments. If searchlight has been on for any length of time, it'll be hot and you'll need asbestos mittens.**

## 2-59. Operating Searchlight AN/VSS-3 or AN/VSS-3A - continued.

**NOTE: For illustration, see previous page 2-151.**

7. HORIZONTAL ADJUSTMENT - With searchlight off, loosen four screws (3) holding searchlight to support. With one man behind searchlight, turn it on and adjust until intensity of beam is at horizontal center of target. Turn searchlight off and tighten four screws.

8. VERTICAL ADJUSTMENT - With searchlight off, back off two jam nuts (4) and turn adjusting screw (5) up or down. Turn on searchlight and see if intensity of beam is at vertical center of target. If not, you'll have to continue turning adjusting screw until you get your vertical center. Once you've got it centered, turn off searchlight and tighten two jam nuts (4).



9. With searchlight off, check jack screw. It should be up firm against gun shield and locked with jam nut. If not, loosen jam nut, tighten jack screw against gun shield, and lock jam nut.

**WARNING: Keep vehicle engine running until searchlight is turned off and searchlight blower stops. If you don't, the lamp could explode.**

10. Turn VISIBLE/INFRARED/OFF switch to OFF.

## 2-59. Operating Searchlight AN/VSS-3 or AN/VSS-3A - continued.

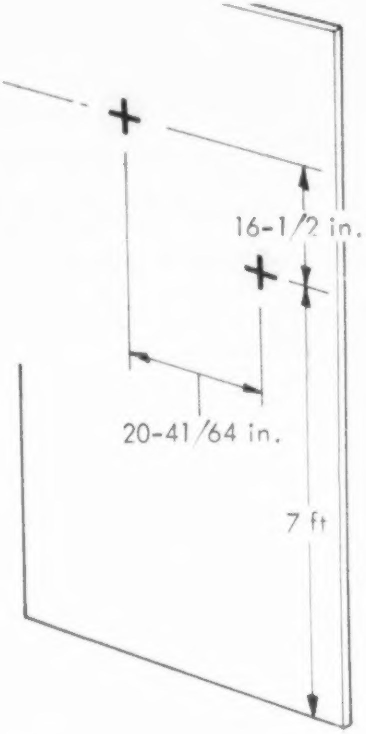
### e. Boresighting Searchlight at 10 Meters.

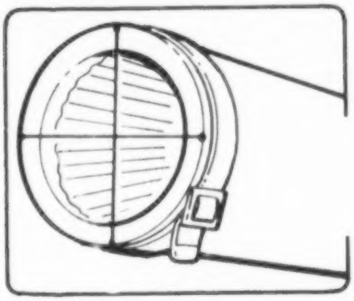
**WARNING: Do not look into searchlight beam. Serious eye damage could result.**

1. Insure telescope has been boresighted and established zero or emergency zero has been applied to telescope before proceeding.

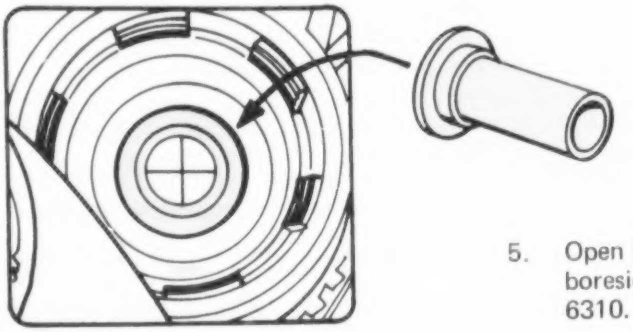
2. On a vertical surface, such as a wall place two crosses as shown in adjacent diagram.

3. Position vehicle so searchlight is facing vertical surface (with crosses) at a distance of about 10 meters -- (about 32-1/2 feet).



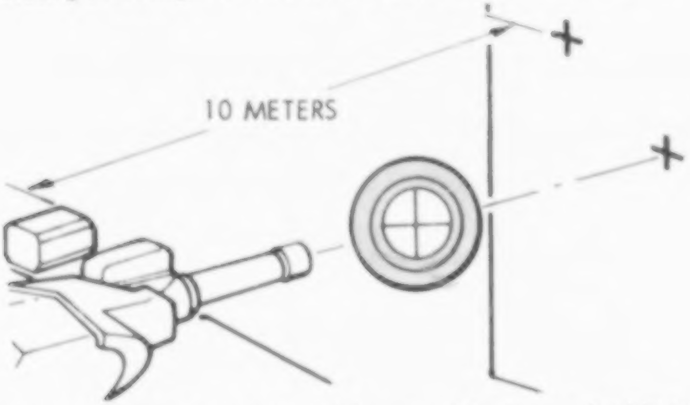


4. Place crosshairs (e.g., black thread) over reference marks on gun muzzle.



5. Open breech and insert breech boresight assembly 4933-00-852-6310.

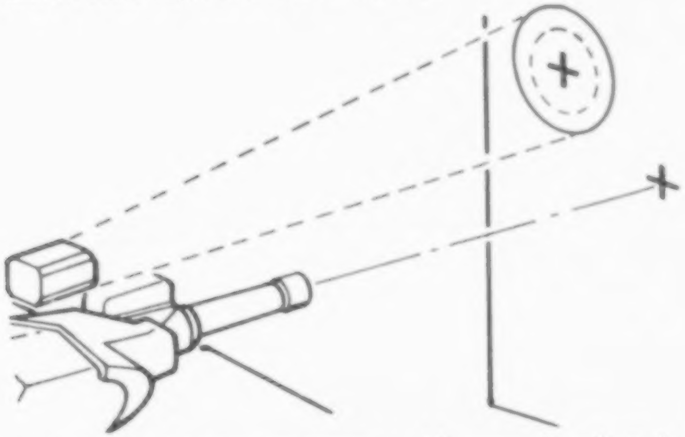
## 2-59. Operating Searchlight AN/VSS-3 or AN/VSS-3A - continued.



6. While looking through boresight assembly, have a buddy traverse and elevate/depress the gun/launcher until crosshairs are aligned with lower cross.
7. Tell driver to start engine and hold at fast idle (1000 to 1300 rpm).

**CAUTION: DO NOT operate searchlight with vehicle off.**

8. Turn on searchlight and set at VISIBLE.



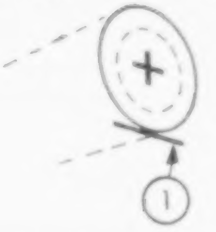
9. Check searchlight beam on target . . . it's correctly adjusted when beam is at horizontal and vertical center of upper cross. If searchlight needs a horizontal or a vertical adjustment, see steps 10. thru 12. next page.

**CAUTION: Turn searchlight off before making adjustments.**

## 2-59. Operating Searchlight AN/VSS-3 or AN/VSS-3A - continued.

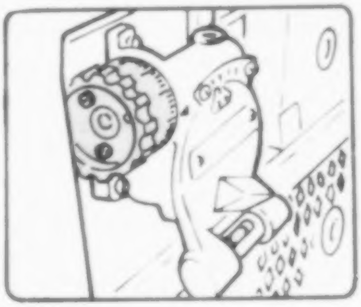
**NOTE: After you've made either of the above adjustments, make certain beam is at both horizontal and vertical center of target . . . if not, you'll have to readjust.**

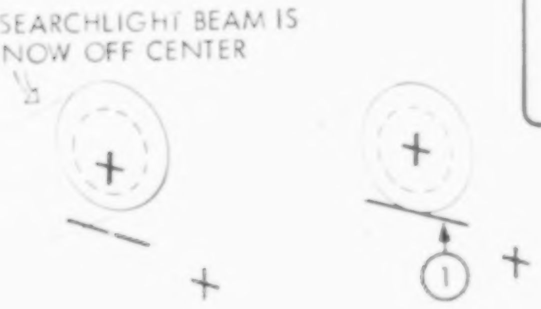
10. With searchlight adjusted on target, place a reference mark (1) at bottom of beam. The top of the mark should just touch the bottom of the beam.



**WARNING: When placing reference mark, don't look back at light. Keep facing forward.**

11. At elevation quadrant, turn micrometer knob until bubble centers. Add +5 mils to the quadrant and manually elevate until bubble again centers.





12. Make vertical adjustment (page 2-152) until bottom of light beam is above and just touching the reference mark (1).

13. Tighten jack screw firmly against gun shield and lock with jam nut.

**WARNING: Keep vehicle engine running until searchlight blower stops. If you don't, the lamp could explode.**

14. Turn VISIBLE/INFRARED/OFF switch to OFF (see page 2-151).

## 2-60. Gas-Particulate Filter Unit M8A3 and Protective Mask M25A1.

**NOTE: Your vehicle is equipped with a filter unit to provide each crew member with clean breathable air during dusty and especially chemical-biological agent attacks. Keep masks, carriers, and hoses in good shape and properly stowed.**

**WARNING: If you're in a toxic gas attack, FIRST put on your mask. Then start operating the gas-particulate filter unit M8A3.**

**WARNING: The filter unit will NOT protect you from carbon monoxide.**

**WARNING: Frostbite to the cheekbone area of the face may be experienced by wearers of the M25/M25A1 protective mask from subfreezing air delivered by the M8A3 gas-particulate filter unit. DO NOT connect the protective mask to the filter unit under these conditions.**

a. Gas-Particulate Filter Unit, M8A3 Data.

1. The filter unit supplies filtered breathable air to four or fewer M25/25A1 masks worn by crew members. It removes all known chemical agents, dust, and other particles from the air. The unit consists of an M2A2 air purifier, air hoses, and electrical cables. The purifier is located in the turret floor under the commander's seat.

2. Three hoses conduct breathable air directly from purifier to each turret crew member's mask.

3. The fourth hose goes to a slip ring furnishing breathable air to the driver.

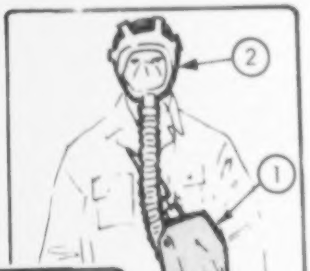
4. Electrical power is provided to the purifier by a cable from the loader's control panel.

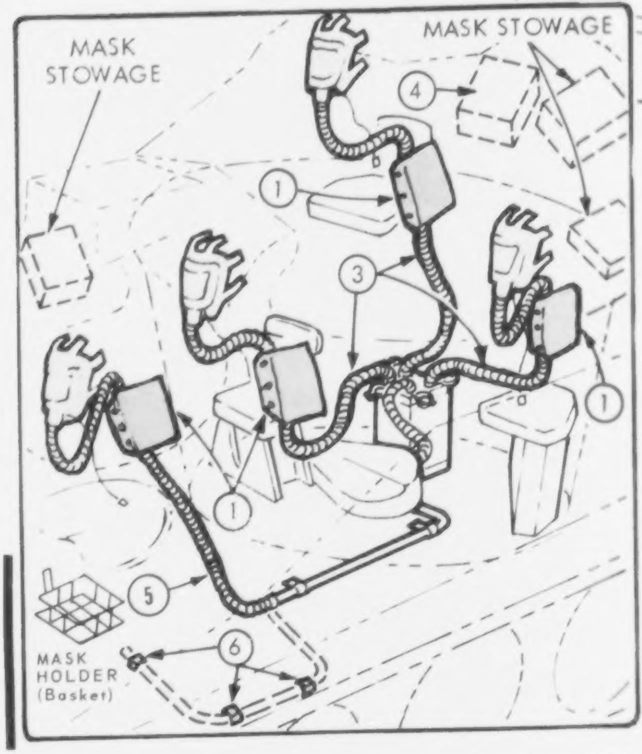
5. A spring clip and airflow control caps are used on the air purifier to close the opening during storage, when not in use and when vehicle is being cleaned.

**2-60. Gas-Particulate Filter Unit M8A3 and Protective Mask M25A1 - continued.**

a. When a chemical-biological attack alarm is given unstrap the mask carrier (1) from stowed position and remove mask (2).

b. Don mask (2) and adjust headbands and facepiece in accordance with TM 3-4240-280-10.

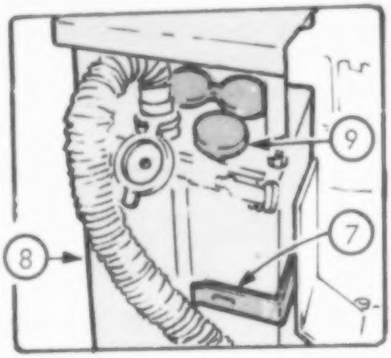




c. Remove commander's, gunner's, and loader's air purifier-to-canister hoses (3) from stowage bag (4). Connect each hose to bottom fitting of each crewman's canister carrier (1).

d. Remove driver's hose (5) from spring clips (6) and connect to cannister carrier (1).

## 2-60. Gas-Particulate Filter Unit M8A3 and Protective Mask M25A1 - continued.

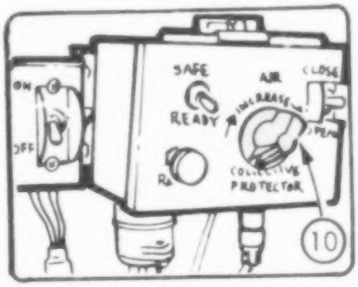


e. Slide spring clip (7) clear of the air intake holes on the air purifier (8).

f. Disconnect caps (9) three locations) from filter unit and connect hoses.

**NOTE: If filter unit is to be used by fewer than four, cover unused outlet(s) with cap(s). When three outlets are used, cover fourth with cap without a center hole. When less than three outlets are used, cover one outlet with a cap without center hole; the other outlets with caps with center holes.**

g. Tell driver to turn on vehicle MASTER SWITCH.



h. At loader's panel turn AIR COLLECTIVE PROTECTOR CONTROL (10) full clockwise . . . this'll turn on filter unit to maximum airflow. If the airflow is uncomfortable for entire crew, adjust to comfort.

AFTER OPERATION

i. Stow all masks and hoses.

j. Turn AIR COLLECTIVE PROTECTOR control (10) full counterclockwise (off).

k. Slide spring clip (7) over the air intake holes on the air purifier. Put solid caps (9) over open holes in air purifier.

## 2-61. Crew-Served Night Vision Sight AN/PVS-2 and AN/TVS-2.

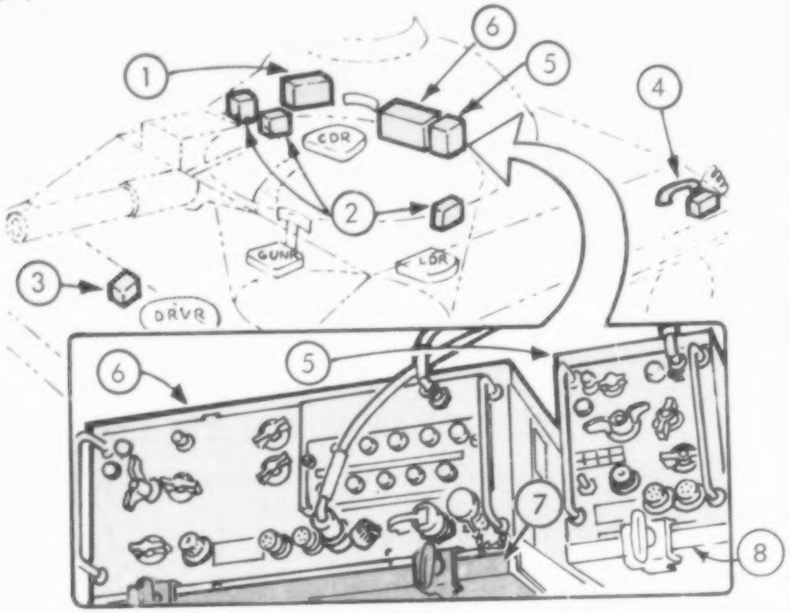
Two models of the night vision sight, mounted on the cal .50, M2 machine gun, are presently used. Refer to the following instructions for installation and use of the sights:

a. AN/PVS-2 - Refer to TM 11-5855-203-13.

b. AN/TVS-2 - Refer to TM 11-5855-202-13.

## Section IV. COMMUNICATION SYSTEMS

### 2-62. Equipment Location and Configuration.



Nomenclature

a. Vehicle Radio Set AN/VRC-12, shown above, consists of:

Audio frequency amplifier AM-1780/VRC (1).

Crew member control boxes C-2298/VRC (2).

Driver's control box C-2297/VRC (3).

Control box C-2296/VRC (4) (located behind left taillight of vehicle).

Radio Receiver R-442(*)/VRC (5).

RT-246(*)/VRC (6).

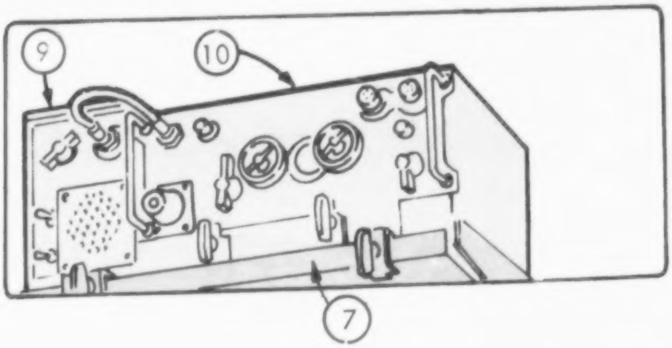
**NOTE: The following are not shown: Antenna AS-1729/VRC, Transient Electrical Suppressor MX-7778(*)/GRC, and Frequency Selector Control C-2742/VRC**

MT-1029/VRC mounting (7).

**NOTE: The (*) in nomenclature number covers all models of the unit.**

MT-1898/VRC mounting (8).

## 2-62. Equipment Location and Configuration - continued.



Nomenclature

b. Vehicle Radio Set AN/VRC-64 shown above, consists of:

Items (1) through (4) and the antenna on page 2-159.

MT-1029/VRC mounting (7).

**NOTE: Radio set AN/VRC-64 can only monitor one frequency at a time. However, MT-1898/VRC is provided for installation of an auxiliary receiver.**

AM-2060/GRC amplifier-power supply (P/O OA-3633/GRC) (9).

RT-841/PRC-77 radio, receiver-transmitter (P/O AN/VRC-64 radio set) (10).

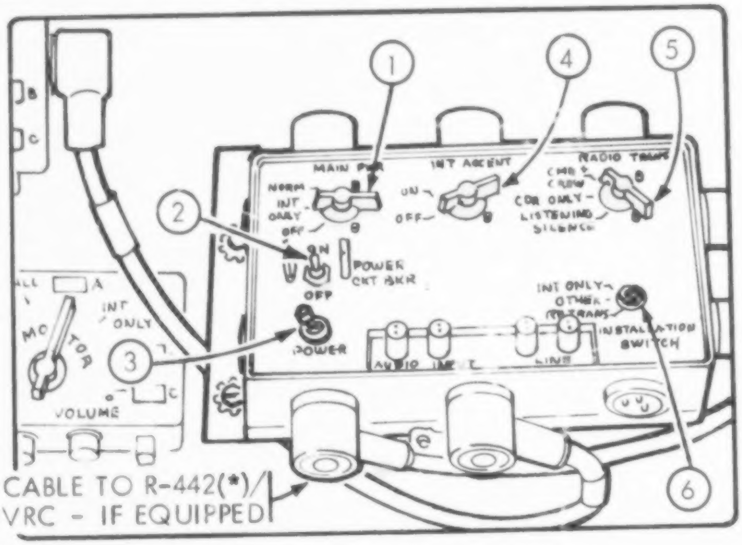
**NOTE: The following are not shown:**
**Antenna AS-1729/VRC and transient electrical suppressor MX-7778(*)GRC.**

## 2-63. Communication Equipment Operation.

a. Vehicle Intercom System AN/VIC-1 (V) Operation.

The AM 1780/VRC is the master control for your radio and intercom systems. Nothing functions until both the vehicle MASTER switch and AM 1780/VRC are turned on. Check INSTALLATION SWITCH (6); it should always be at OTHER.

**CAUTION: Before starting vehicle engine, make certain the MAIN PWR switch (1) is off. The initial start of the engine could damage the AM 1780/VRC.**



1
4
5
2
3
6
MAIN PWR
NORM
INT ONLY
OFF
INT ACCENT
ON
OFF
RADIO TRANS
CDR ONLY
LISTENING SILENCE
ON
OFF
POWER CKT BKR
POWER
INT ONLY
OTHER
INSTALLATION SWITCH
AUDIO INPUT
LINE
MONITOR
INT ONLY
VOLUME
A
B
C
CABLE TO R-442(*)/VRC - IF EQUIPPED

1. INTERCOM ONLY FUNCTION. With vehicle power on, set MAIN PWR switch (1) to INT ONLY and POWER CKT BKR switch (2) to ON. POWER lamp (3) should light.

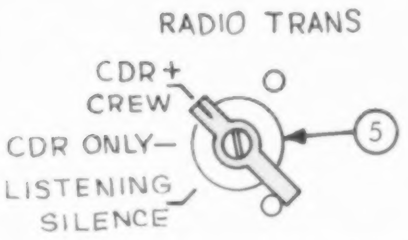
2. RADIO AND INTERCOM FUNCTION

   (a) With vehicle power on, set MAIN PWR switch (1) to NORM and POWER CKT BKR switch (2) to ON.

   (b) Turn on receiver-transmitter. POWER lamp (3) should light.

   (c) You will now pick up both radio and intercom signals. To make intercom signals louder, set INT ACCENT switch (4) to ON (at OFF both signals are the same).

(d) Set RADIO TRANS switch (5) to one of the following three settings:



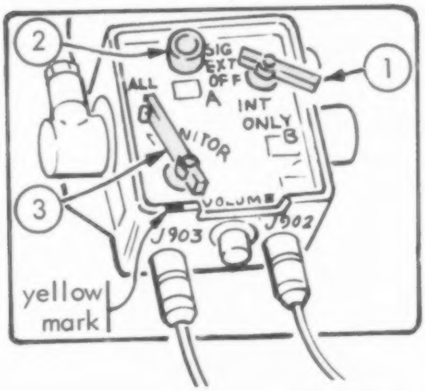
CDR + CREW: everyone can transmit on receiver-transmitter.

CDR ONLY: only commander can transmit.

LISTENING SILENCE: nobody can transmit, but everyone still receives.

(e) To turn off, set switches (1) and (2) to OFF. This also turns off the radios.

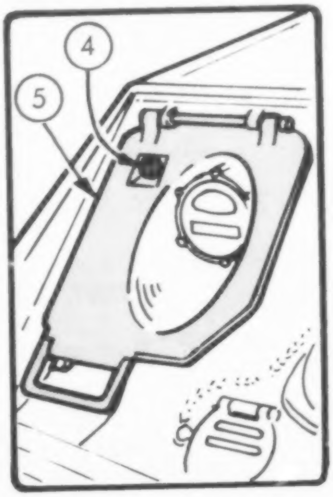
b. Driver's Control Box C-2297/VRC Operation. The driver's control box (shown at left) operates in the same manner as does the C-2298/VRC crew members control box (paragraph 2-63, h. starting on page 2-168) except that the driver has the added responsibility of allowing personnel outside of the vehicle to communicate with crew members and operate the radio using the control box C-2296/VRC located behind the left taillight of the vehicle.



c. External Control Box C-2296/VRC Operation. To use the C-2296/VRC outside of vehicle proceed as follows:

1. Signal crew member at C-2296/VRC VRC by turning SIG switch (1) to SIG several times; each time the call lamp should light. Your SIG lamp (2) also lights.

2. To talk to the person outside vehicle, set SIG switch (1) to EXT (SIG lamp (2) remains lighted), MONITOR switch (3) to INT ONLY, and helmet switch rearward.



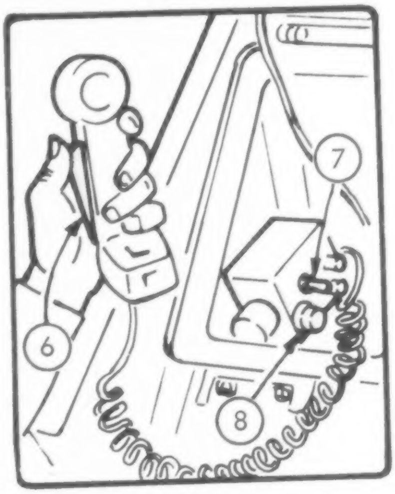
3. When SIG lamp (2) lights, someone outside vehicle at C-2296/VRC is calling. Establish contact as in step 2, page 2-162.

4. To call driver inside, open cover (5), take out handset, and press handset switch (6) once. Driver's SIG lamp should light and stay lit until driver answers. Press switch (6) to talk; release to listen.

5. When call lamp (4) flashes, driver is trying to attract attention of person outside vehicle. To answer, open cover (5) and take out handset. Press handset switch (6) to talk; release to listen.

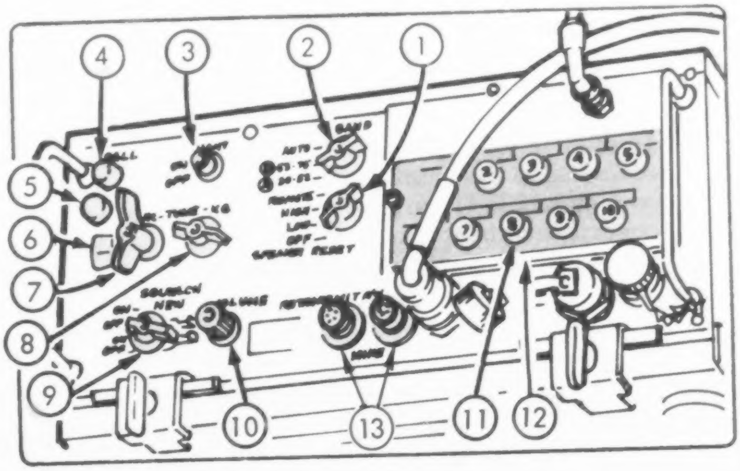
6. To use receiver-transmitter, ask driver to set his MONITOR switch to A or ALL. When that is done, hold control switch (7) in RAD TRANS position. When transmitting press handset switch (6); release both switches to listen.

7. Adjust VOLUME knob (8) as desired.



d. Radio Set AN/VRC-12 operation.

**NOTE: For full-range radio communication, do not tie down the whip antenna (AS-1729/VRC), even when the vehicle is in motion.**



## 2-63. Communication Equipment Operation - continued.

1. AM-1780/VRC must be on with MAIN PWR switch at NORM.

2. Receiver - Transmitter RT-246(*) VRC.

   (a) Set POWER switch (1) to LOW; set LIGHT switch (3) to ON . . . lamp (5) lights in dial window (6) and, set SQUELCH switch (9) to NEW OFF. If you can't contact the other radio station, set the POWER switch to HIGH.

   (b) For noise-free operation set SQUELCH switch (9) to NEW ON. Then, CALL lamp (4) lights when signal comes in.

   (c) For Manual Operation, set BAND switch (2) to that span of frequency (A or B) that include your assigned frequency. Then turn MC (7) and KC (8) knobs until you get your frequency in dial window.

   (d) For Pushbutton Operation, first preset your frequencies by opening door (12) and following instructions inside. To use pushbuttons (11), set BAND switch (2) to AUTO and press the button you want. Check your dial window (6) . . . your frequency should show up within 5 seconds.

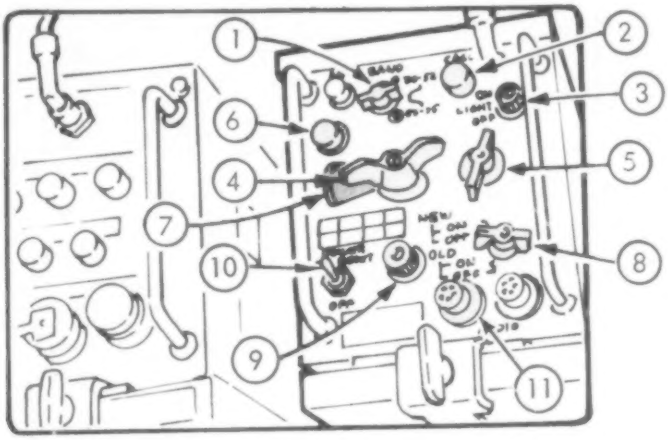
   (e) For Remote Operation (if issued) first setup the pushbutton in step d. above; then set POWER switch to AUTO. Then use one or the other C-2742/VRC Frequency Selector controls (located above the TC and loader's C-2298/VRCs) to control the radio. This is accomplished by pushing the toggle switch on the left side of the box. The amber lamp lights indicating control (the lamp on the other C-2742/VRC goes out). To control the radio output power, set C-2742/VRC PWR switch to LO (or to HI if you can't reach the other radio station). Set the C-2742/VRC CHAN SEL switch to the desired radio channel: counterclockwise position one corresponds to pushbutton one; position two to pushbutton two.

   (f) To communicate on the RT-246(*)/VRC, use the CVC helmet connected to the control boxes (paragraph 2-63, step h. starting on page 2-168). If you can't operate the radio from any control box, connect the shorter cord connector of the CVC helmet (the longer cord has a yellow band) to either MIKE receptacle (13).

## 2-63. Communication Equipment Operation - continued.

### 3. Receive R-442(*)/VRC Operation.

**NOTE: For full distance communication, do not tie down the receiver antenna, even when vehicle is in motion.**



(a) Set POWER switch (10) to ON-RESET; set LIGHT switch (3) to ON . . . lamp (6) lights in dial window (7). Set SQUELCH switch (8) to OFF.

(b) To set or change frequencies, set BAND switch (1) to that span of frequencies (A and B) that include your assigned frequency. Then turn your MC (4) and KC (5) knobs until you get your frequency in dial window.

(c) To eliminate rushing noise, set SQUELCH switch (8) to NEW-ON. Then when signal comes in, CALL lamp (2) lights.

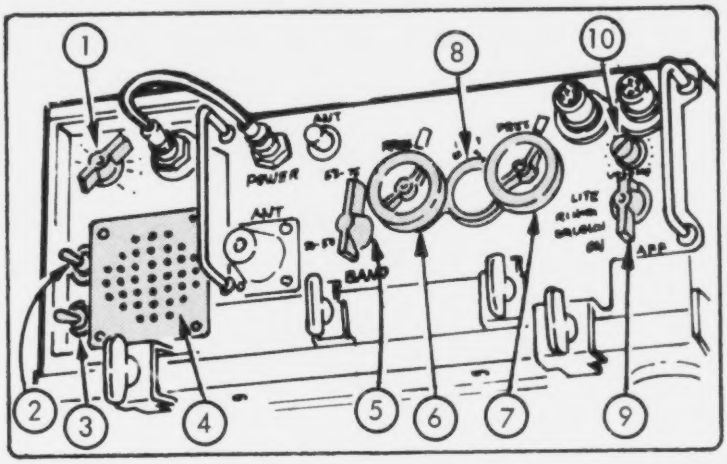
(d) Turn VOLUME knob (9) to MAXIMUM clockwise.

(e) To listen to the signals from the R-442(*)/VRC, use the CVC helmet connected to the control boxes (paragraph 2-63, h., starting on page 2-168). If you can't hear the receiver from any control box, connect the shorter cord connector (the longer cord has a yellow band) to either AUDIO receptacle (11).

(f) To turn off everything, set the AM-1780/VRC MAIN PWR switch to OFF and set the MX 7778/VRC circuit breaker to OFF.

e. Radio Set AN/VRC-64 Operation.

**NOTE: For full distance communication, do not tie down the receiver-transmitter antenna, even when vehicle is in motion.**



1. On the AM-1780/VRC, the MAIN PWR switch must be at NORM.

2. Set PWR switch (3) to ON, and function switch (9) to ON. For noise-free operation, set function switch to SQUELCH.

3. Set SPKR switch (2) to OFF. If you're having helmet earphone problems, you set it to ON and hear in-coming calls on loudspeaker (4).

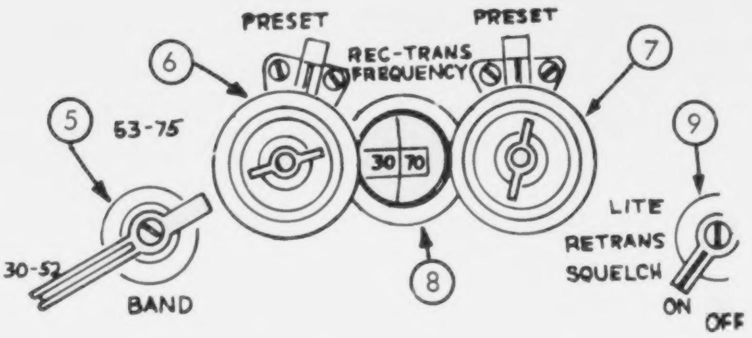
4. Turn VOLUME control (10) to maximum.

5. To set or change frequencies (see next illustration):

   (a) Set BAND switch (5) to that span of freq (30 to 52 or 53 to 75) that include your assigned frequencies. Set ANT FREQ CONTROL (1) to click stop between the frequencies containing your assigned frequency.

   (b) Turn your MC (6) and KC (7) knobs until you get your frequency in dial window (8). To light your dial window, push up function switch (9) to LITE.

6. To communicate on the radio, use the CVC helmet connected to the control boxes (paragraph 2-63, h., starting on page 2-168). If you can't operate the radio from any control box, connect the


PRESET
PRESET
REC-TRANS FREQUENCY
6
7
5
53-75
9
30 70
LITE
RETRANS
SQUELCH
30-52
BAND
8
ON
OFF

shorter cord connector of the CVC helmet (the longer cord has a yellow band) to either AUDIO receptacle.

7. To turn off everything, set AM-1780/VRC MAIN PWR switch to OFF and MX-7778/VRC circuit breaker to OFF.

f. Intercom Only Operation.

With vehicle power on and MX-7778/GRC PWR switch in the ON position, set main PWR switch (1) to INT only and PWR CKT BKR switch (2) to ON. POWER lamp (3) should light (under this situation, the radio(s) is (are) turned off).

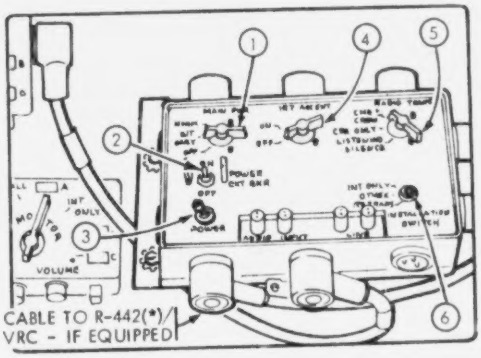
g. Radio and Intercom Operation.

1. With vehicle power on and MX-7778/GRC PWR switch on, set MAIN PWR switch (1) to NORM and POWER CKT BKR switch (2) to ON.

**NOTE: With the AN/VRC-64, turn on the AM-2060/VRC.**

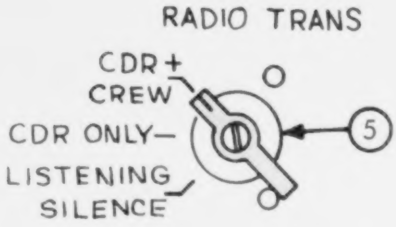
2. Turn on receiver-transmitter. POWER lamp (3) should light.

3. You will hear both radio and intercom signals. To make intercom signals louder, set INT ACCENT switch (4) to ON (at OFF, both signals are the same).


1
4
5
2
3
6
MAIN PWR
INT ACCENT
RADIO TRANS
ON
OFF
POWER CKT BKR
POWER
INT ONLY
MONITOR
VOLUME
INSTALLATION SWITCH
CABLE TO R-442(*)/VRC - IF EQUIPPED

best copy available

4. Set RADIO TRANS switch (5) to one of the following three settings:


RADIO TRANS
CDR + CREW
CDR ONLY
LISTENING SILENCE
5

CDR + CREW: everyone can transmit on receiver-transmitter.

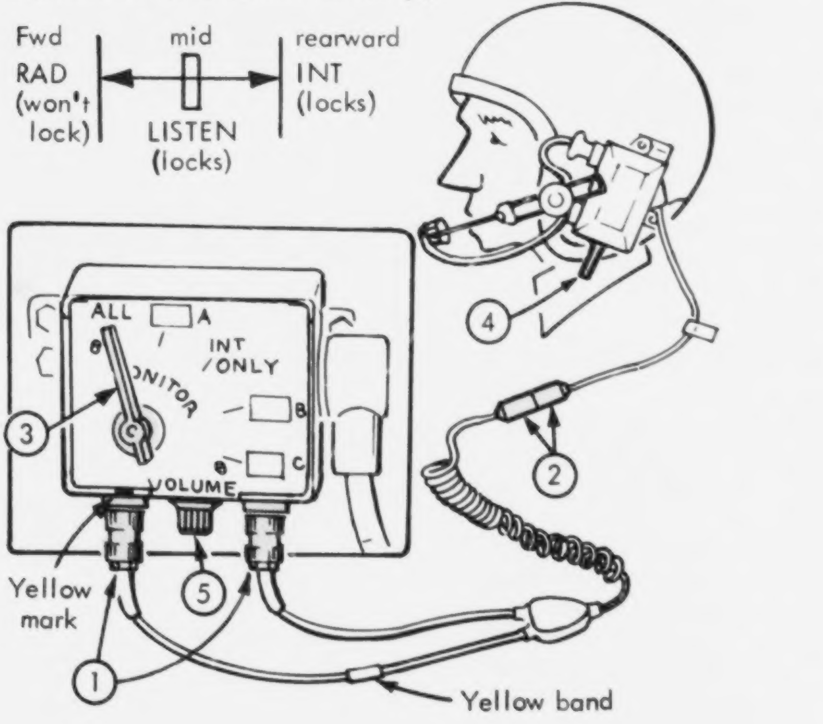
CDR ONLY: only commander can transmit.

LISTENING SILENCE: nobody can transmit, but everyone still receives.

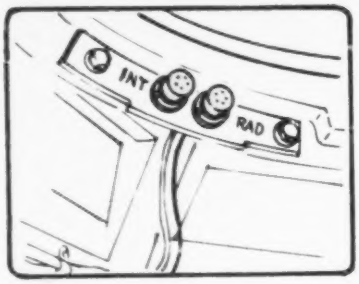
5. To turn off, set MAIN PWR and POWER CKT BKR switches (1) and (2), page 2-167, to OFF. This also turns off the radios.

h. Crew Members Control Box C-2298/VRC Operation.

Positions of CVC helmet switch (4)


Fwd
RAD
(won't lock)
mid
LISTEN
(locks)
rearward
INT
(locks)
ALL
A
MONITOR
INT /ONLY
B
C
VOLUME
3
4
2
Yellow mark
5
1
Yellow band

**NOTE: Commander connects CVC helmet cable connectors to receptacles located on cupola rim (yellow band connector to INT receptacle).**



1. Connect CVC helmet cable connectors (1) to control box receptacles. Cable with yellow band (longer cable) connects to receptacle with yellow mark.

2. Check if bail-out connectors (2) are snapped in place.

3. During operation, adjust VOLUME knob (5) for best reception.

4. To use the radio:

   (a) Set MONITOR switch (3) to A or ALL. To talk on receiver-transmitter, push helmet switch (4) forward and talk into mike; release switch to listen. Leave in midposition to listen for radio and intercom signals.

**NOTE: When MONITOR switch (3) is in ALL position, all signals (receiver-transmitter, receiver, and intercom) can be heard simultaneously.**

   (b) To listen to radio receiver, when one is provided, set MONITOR switch (3) to B, and helmet switch (4) to midposition.

**NOTE: When a crew member, except the commander, is talking on radio and another crewmember starts to talk on intercom, the radio connection is broken.**

5. To use intercom, with MONITOR switch (3) at A, ALL, or INT ONLY, talk to other crew members by pushing helmet switch (4) rearward. Set to midposition when completed.

# Section V. OPERATING UNDER UNUSUAL CONDITIONS

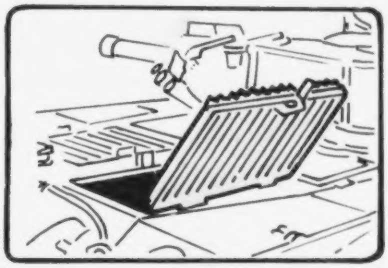
## 2-64. Cold Weather Starting.

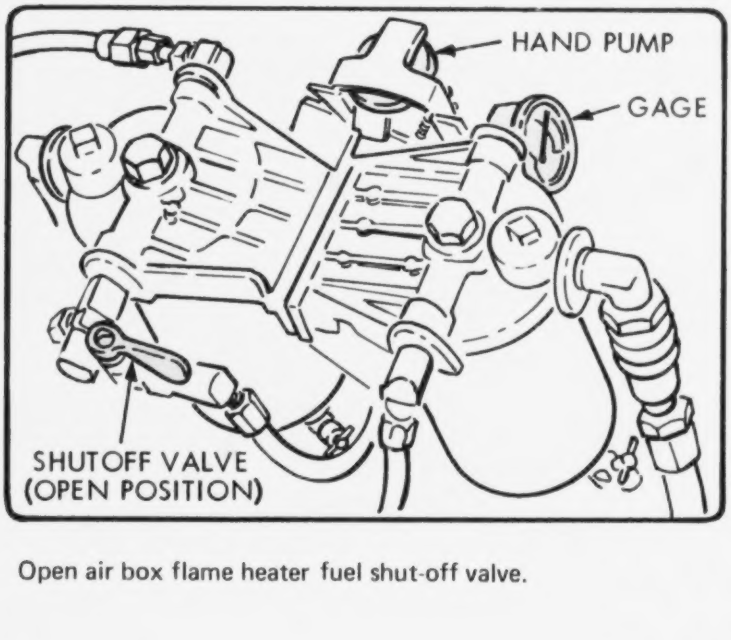
Refer to Operation and Maintenance Manual of Ordnance Materiel in Cold Weather (0°F to-65°F), TM 9-207.

> **NOTE: Steps marked** are applicable only to vehicles with hand pump lock and air box flame heater fuel shutoff valve. All other steps are applicable to all vehicles.**

a. Preparation for Starting.

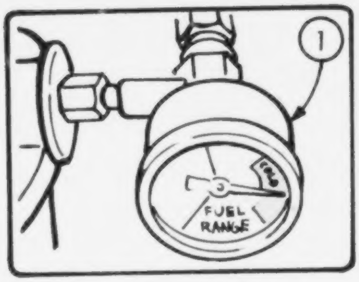
1. Traverse turret to the side and open engine compartment right exhaust grille.

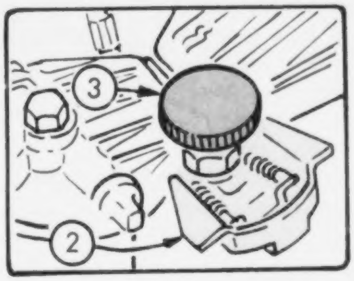




**2. Open air box flame heater fuel shut-off valve.

## 2-64. Cold Weather Starting - continued.





3. Check pressure gage (1). Pressure indicator should be in cold start area of gage. If not, use accumulator hand pump to increase pressure as follows:

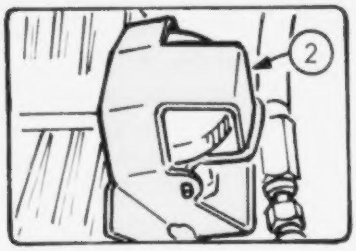
   **(a) Release accumulator hand pump lock (2).

   (b) Turn pump handle (3) to release from detent. Pump to increase pressure.

4. After attaining required pressure, rotate pump handle to engage detent.

**5. Secure hand pump lock (2) and close fuel shut-off valve.

6. Close engine compartment grille.



b. Starting.

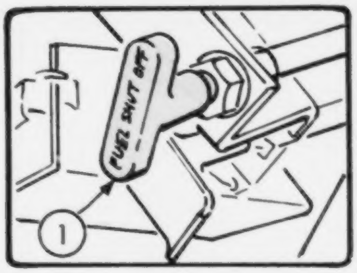
1. Shift to N. Depress service brake pedal and pull out and up on parking brake lock handle to set brake. Pull water/land steer shift control to land.

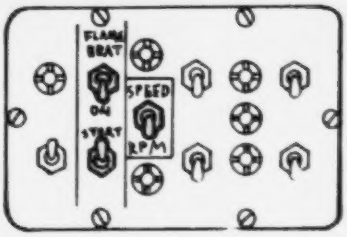
2. Turn vehicle MASTER SWITCH on.

3. Press SPEED/RPM switch to RPM.

**NOTE: If coolant heater has been operating, you can skip step 4.**

## 2-64. Cold Weather Starting - continued.



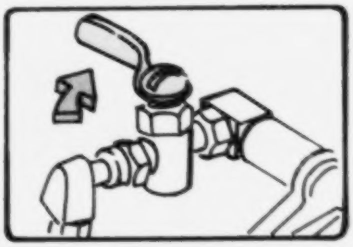


4. Pull out FUEL SHUTOFF control knob (1). Hold ENGINE STARTER switch in START and FLAME HEAT switch in ON position for 15 to 20 seconds.

5. Push in FUEL SHUTOFF knob (1) and continue to hold STARTER switch in START. Cycle FLAME HEAT switch ON and OFF one or two times per second. Pause 2 seconds in the OFF position every 7 to 10 seconds until engine reaches 400 to 500 rpm. After reaching required rpm, depress accelerator halfway and release STARTER switch.

**NOTE: If engine does not start firing after 40 seconds of cranking or if the indication of cylinder firing ceases for a period of over 10 seconds, stop cranking. Check pressure gage (1) page 2-171 for proper operation. If a malfunction is evident, use troubleshooting procedures, starting on page 3-33, to determine the cause.**

6. With brakes locked, shift into 4th and continue running engine at 1200 to 1500 rpm until ENG COOLANT gage indicate 120° to 140°F. If TRANSMISSION TEMP warning light comes on, shift to N and idle at 1200 to 1500 rpm until light goes out.



**7. Open right exhaust grille and close flame heater fuel shutoff valve. Close grille.

8. When through with vehicle for the day, open right exhaust grille and recharge accumulator as follows:

    **(a) Open flame heater shut-off valve.
    **(b) Unlock hand pump lock.
    (c) Release pump handle from detent.
    (d) Run engine in neutral at 2000 rpm (approx) until no further increase in pressure is apparent on accumulator pressure gage (1).
    (e) Return pump handle to detent position.
    **(f) Secure hand pump lock.
    **(g) Close flame heater shut-off valve.
    (h) Close exhaust grille.

## 2-65. Extreme Hot and Cold Weather Operation.

a. Continuously observe engine and transmission warning lights and coolant temperature gage for indications of incorrect operation.

b. In cold weather, avoid blowing breath on optical surfaces to prevent deposits of condensation which may freeze.

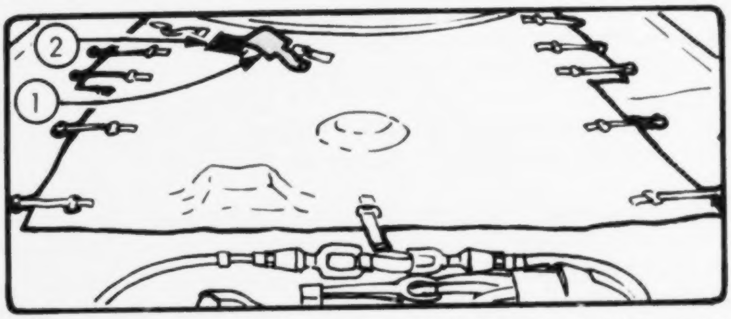
**WARNING: Frostbite to the cheekbone area of the face may be experienced by wearers of the M25/M25A1 protective mask from sub-freezing air delivered by the M8A2 gas-particulate filter unit. DO NOT connect the protective mask to the filter unit under these conditions.**

## 2-66. Operation of Winterization Kit Coolant Heater.

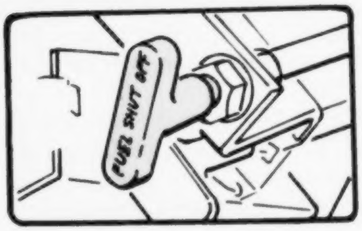
The coolant heater is used to raise temperature of engine oil, engine coolant, and battery electrolyte when engine is shutdown in ambient temperatures at −25°F and below.

**WARNING: Turret must be positioned so that all grenade launchers are clear of heater exhaust outlet (2).**

**NOTE: On a cold-soaked vehicle, operate heater 3 to 5 hours before attempting to start engine. Don't operate any other electrical equipment while using heater.**



a. Fold back and secure flap (1) on forward left corner of grille cover to uncover heater exhaust pipe (2).

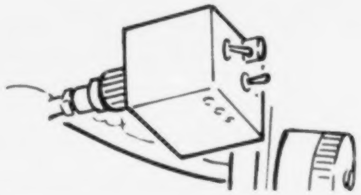


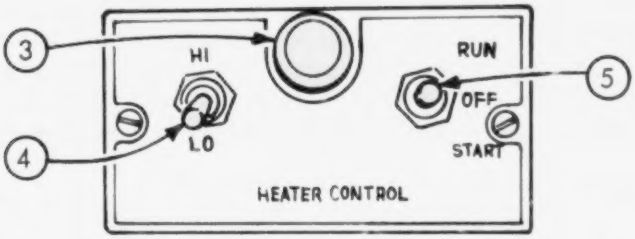
b. To lessen battery drain, make sure vehicle MASTER SWITCH is off.

c. Be sure FUEL SHUTOFF valve on center fuel tank is open.

### 2-66. Operation of Winterization Kit Coolant Heater - continued.

**NOTE: COOLANT HEATER control box is located next to auxiliary power receptacle.**





d. Depress HEATER CONTROL indicator light (3) to check lamp. If lamp does not light, replace it. If new lamp doesn't light, notify organizational maintenance.

e. Place heat selector switch (4) to LO position.

**CAUTION: When trying to start heater, do not hold control switch at START for more than 2 minutes at a time.**

f. Hold heat control switch (5) in START position until indicator lamp (3) lights (1 to 2 minutes). Coolant heater has started.

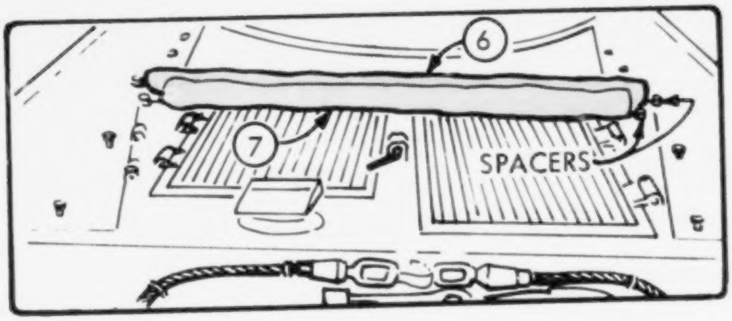
g. If indicator lamp does not light within 2 minutes turn control switch (5) OFF. Wait 5 minutes and repeat preceding step f. If lamp does not light after third attempt, turn control switch OFF and notify organizational maintenance.

h. MOVE heat control switch (5) to RUN.

i. Ten minutes after indicator lamp has lit, place heat selector switch (4) in HI position.

**NOTE: Heat selector (4) should remain at HI. The heater thermostat will automatically switch heater from high to low heat; maintaining proper system temperature.**

## 2-66. Operation of Winterization Kit Coolant Heater - continued.



j. Unfasten two or four straps on engine intake grille cover (6). Roll cover to form smallest possible tube. Secure straps onto unused spacers at forward end of exhaust grille.

k. Unfasten three or five straps on exhaust grilles cover (7) and roll cover into smallest possible tube form. Secure straps onto spacers at rear end of intake grille.

**NOTE: Remove grille covers for prolonged engine operation or during firing of gun/launcher.**

l. Place heat control switch to OFF. Indicator light will stay on and blower will continue to run for 2 or 3 minutes until combustion chamber has been purged. (Master battery switch must be on.)

m. Start vehicle engine (starting on page 2-170).

**NOTE: Do not operate coolant heater when engine is running.**

n. After vehicle operation, shut down engine and recover grilles.

## 2-67. Gun/Launcher Dust Shield.

In warm temperatures, where excessive moisture is evident, remove the dust shield weekly. Dry all affected parts and check exposed portion of recoil mechanism sleeve for corrosion and rust.

## 2-68. Missile Tracker.

Temperature changes of 30°F or more can cause the tracker to change alignment. If this occurs, realign tracker (paragraph 2-48, step e, starting on page 2-102).

### 2-69. Snowy Conditions - Missile Launching.

If you've got over 1/4-inch of snow on the front of your vehicle, sweep it off before firing. Launching a missile from a snow covered vehicle blows snow back on tracker . . . this weakens the guidance signals or it could completely black 'em out. Also, the snow will cover up your optics.

### 2-70. SHILLELAGH Missiles.

The firing temperature limits are -25°F to +145°F.

### 2-71. Laser Range Finder (LRF).

a. Cold Weather. When the LRF is initially set up, check the optical surfaces and test all mechanical devices for proper operation. Ice may have formed on optical surfaces, rotating mechanisms, and the like, and may be sufficient to hamper lasing operations. Make sure that snow or ice does not collect between the receiver-transmitter unit. In addition, the receiver-transmitter eyepiece may tend to fog during extended tracking operations (especially if a face mask is not worn) and may require cleaning. The laser range finder operation may deteriorate if the ambient temperature is lower than -40°F. At temperatures below -25°F the system battery will not charge. In this case, a MALF 0001 indication will be detected. This does not indicate an equipment malfunction. The LRF will operate correctly if external power is adequate. When the LRF is used to range on a target under these conditions, the MALF 0001 will be replaced by the actual target range. Upon resetting the LRF, MALF 0001 will reappear.

b. Hot Weather. The operation of the laser range finder may deteriorate if the ambient temperature is higher than +125°F.

c. High Humidity. The laser range finder is designed to operate properly regardless of humidity conditions. The only requirement is that the target must be visible through the telescope sight.

d. Altitude. The LRF is designed to operate in atmospheric pressures equivalent to the atmospheric pressure between sea level and 10,000 feet above sea level.

e. Low Auxiliary Battery. Low battery LOW light may remain lit. In this case, have organizational maintenance replace the auxiliary power supply unit (A78).

## 2-72. 7.62-MM and Cal .50 Machine Guns.

a. In Extreme Cold. To keep your machine guns operating in extreme cold do the following:

1. Keep all moving parts free of moisture. Before firing in subzero temperatures, if you've got time, disassemble, clean all parts, and lubricate . . . lubricate sparingly.
2. Frequently hand-operate machine gun.
3. After firing, clean and lubricate.
4. Keep your cal .50 gun covered when not in operation.
5. If vehicle (or dismounted machine gun) is brought indoors, let guns reach room temperature . . . then disassemble, clean all parts, and lubricate.

b. In Hot, Dry, Humid, and Salty Climates. Because of the thinning out effect these climates have on lubricants, you'll have to service your machine gun more frequently. Check unexposed parts and exposed surfaces for freedom from moisture . . . then clean and lubricate.

c. In Dusty or Sandy Areas. Dust and sand can jam your machine gun. To keep them operating do the following:

1. Inspect gun daily and clean as necessary.
2. Wipe lubricants from exposed and non-critical operating surfaces. This'll prevent sand from sticking to lubricant and forming an abrasive.
3. Immediately after use, clean the gun.
4. After handling, wipe gun with a dry rag to remove perspiration . . . a little perspiration can cause rust.
5. Cover equipment as much as possible.

d. After Exposure to Water. If your machine gun is drenched or submerged in water, turn it in to organizational maintenance for complete disassembly, cleaning, and lubrication.

### 2-73. Radio and Intercom Equipment.

a. At Low Temperatures. To get the maximum out of your radio and intercom equipment, do the following:

1. Keep front panel controls free of ice . . . iced controls can prevent control shafts from turning.
2. On receiver-transmitters, keep blower air intake and exhaust ports free of ice.
3. Keep antenna(s) free of ice . . . iced antenna(s) cuts down your receiver-transmitting capabilities.
4. Be careful with cables. Cold weather makes them brittle . . . the cables could break.

b. In Desert and Dusty Climates. Keep equipment as clean as possible. Keep receiver-transmitter blower air intake and exhaust ports free of sand and dust.

### 2-74. Infrared Searchlight AN/VSS-3 or AN/VSS-3A.

**CAUTION: Don't operate searchlight when you're swimming the vehicle.**

a. Swimming. Before swimming vehicle, check your searchlight . . . it should be watertight.

1. Check condition of window gasket and make sure window clamp is closed and tight.
2. Check condition of heat exchanger gasket. Make sure cover latches are closed and tight.

b. In Arctic Climate. During subzero temperatures, keep searchlight covered when you're not operating it. Frequently check for the following:

1. Remove any snow and ice . . . pay special attention to window and air intake and exhaust ducts.
2. Check for damaged power cable, window clamp, and window. If any damage, you'll need organizational maintenance.

**2-74. Infrared Searchlight AN/VSS-3 or AN/VSS-3A - continued.**

c. In Tropical Climate. Your biggest villain is condensation/moisture. To fight this, check for the following:

1. Frequently check searchlight, remote control panel, and panel of main control for moisture, corrosion, and fungus. When needed, wipe dry and clean.
2. Check window and heat exchanger for a tight fit.
3. Check air intake and exhaust ducts for obstructions . . . if any, remove.
4. Check all electrical connectors for tightness.
5. When not operating, keep searchlight covered.

d. In Desert Climate. Your primary problems are heat, dust, and sand. To fight these, do the following:

1. Don't remove window or heat exchanger except when absolutely necessary.
2. Whenever possible, stay in a sheltered area or alongside a natural barrier to protect against blowing dust and sand.
3. Check air intake and exhaust ducts . . . if dirty or obstructed, flush openings with water.
4. Keep equipment clean and searchlight covered when not in operation.

e. Around Salt Water Spray. To keep the searchlight operating, do the following:

1. When possible, keep searchlight under a permanent shelter. Keep cover on searchlight when not in operation.
2. During dry periods remove cover and let searchlight dry.
3. Regularly wash searchlight with clean water and wipe dry with a clean, lint-free cloth.
4. Check painted surfaces for cracks, peeling, and blisters . . . report any paint problems to organizational maintenance.

# Section VI. AMMUNITION

## 2-75. 152-MM Conventional Ammo.

a. Authorized Rounds.

1. Authorized rounds of conventional ammo are listed in table 2-1 on page 2-181.

2. This family of ammo is issued as fixed (complete and permanently assembled) rounds. It consists of these five types:

   HE-T - - - High-explosive with tracer (figure 2-6 on page 2-182).

   HEAT-T-MP - - - High-explosive anti-tank with tracer, multipurpose (figure 2-7 on page 2-182).

   Canister - - - Flechette-loaded, antipersonnel (figure 2-8 on page 2-183).

   TP-T - - - target practice with tracer.

   Dummy - - - Inert-loaded, drill.

b. Firing Tables. FT 152-A-1 contains firing data for 152-mm ammo.

c. Identification.

1. Complete rounds are identified by color (type of ammo) and marking (type, model number, lot number, caliber, weapon, etc.). Markings are stenciled on the projectile in the appropriate color. See table 2-1 for color coding; figure 2-6 and 2-8 on pages 2-182 and 2-183 for marking.

2. You can also identify 152-mm ammo by its distinctive cartridge case. The texture of the nonmetallic case is similar to fiberboard; the color is light yellow.

Table 2-1. Authorized Rounds

| Round | Color of projectile | Action of fuze | Tactical use |
|---|---|---|---|
| CARTRIDGE, 152-MM: HE-T, XM657E2 (M657) w/FUZE, PD: XM720E1 (M720) | Olive drab w/ yellow marking | Superquick | Antipersonnel, antimateriel |
| CARTRIDGE, 152-MM: HEAT-T-MP, M409 series w/FUZE, PIBD: M539 | Black w/yellow marking | Superquick | Defeat armor, antipersonnel, antimateriel |
| CARTRIDGE, 152-MM: canister, M625 series | Olive drab w/white marking and band of white diamonds | Unfuzed | Antipersonnel (effective in dense foliage) |
| CARTRIDGE, 152-MM: TP-T, XM411E3 (M411) w/FUZE, PD: M557 | Blue w/white marking and one yellow band | Superquick | Training |
| CARTRIDGE, 152-MM: TP-T M411A1, M411A2, M411A3 | Blue w/white marking | Unfuzed | Training |
| CARTRIDGE, 152-MM: dummy M596 | Blue w/white marking | Unfuzed | Drill (handling) |

## 2-75. 152-MM Conventional Ammo - continued.

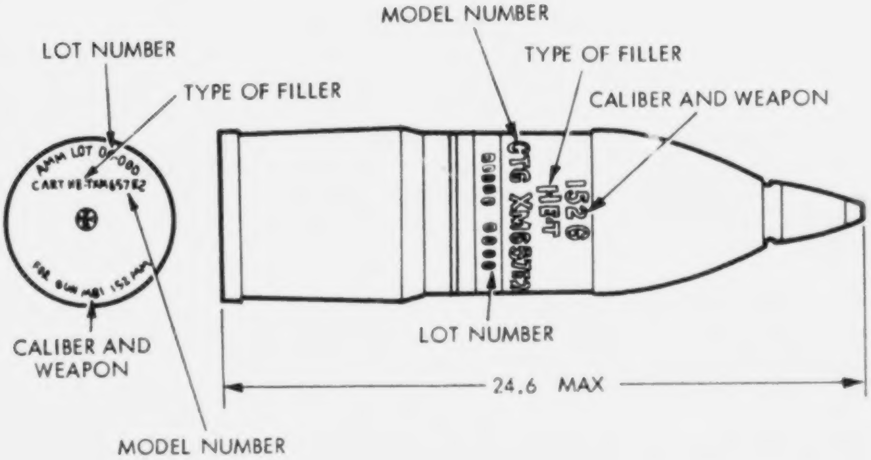

MODEL NUMBER
LOT NUMBER
TYPE OF FILLER
TYPE OF FILLER
CALIBER AND WEAPON
AMM LOT 0-000
CART HE-TXM657E2
FOR GUN M81 152 MM
152 G
HE-T
CTG XM657E2
0000 0000
LOT NUMBER
CALIBER AND WEAPON
24.6 MAX
MODEL NUMBER

Figure 2-6. 152-mm HE-T Cartridge XM657E2 with Cartridge Case XM157

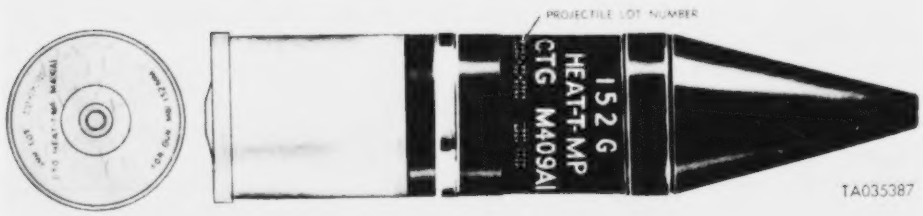

PROJECTILE LOT NUMBER
152 G
HEAT-T-MP
CTG M409A1
TA035387

Figure 2-7. 152-mm HEAT-T-MP Cartridge M409A1

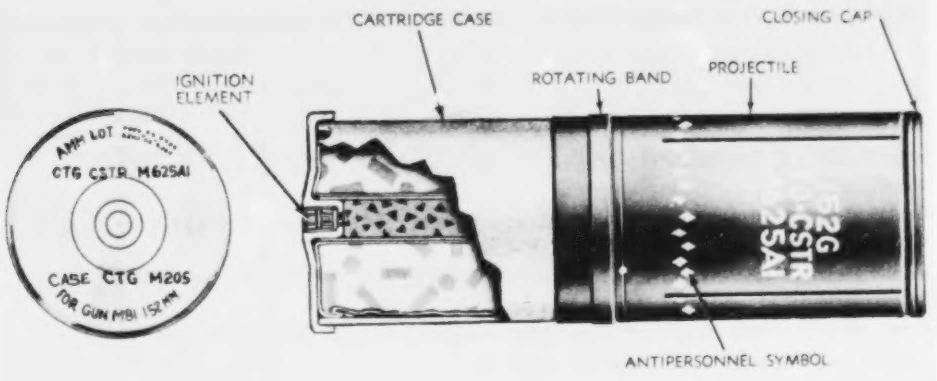

CARTRIDGE CASE
CLOSING CAP
IGNITION ELEMENT
ROTATING BAND
PROJECTILE
AMM LOT
CTG CSTR M625AI
CASE CTG M205
FOR GUN M81 152 MM
152G
CSTR
25AI
ANTIPERSONNEL SYMBOL

Figure 2-8. 152-mm Canister Cartridge

d. Packaging.

1. To protect the nonmetallic cartridge case from moisture, each round is packed in a neoprene or elastomeric barrier bag. The bag completely covers the cartridge case and is drawn tight around the base of the projectile. The cuff of the bag is folded back. A warning, "REMOVE THIS BAG IMMEDIATELY PRIOR TO FIRING," is stenciled on the bag.

2. For shipping and storage, each bagged round is packed in a metal or fiber container containing a desiccant (drying agent) and a humidity indicator (new rounds do not contain humidity indicators). The fiber container is enclosed in an hermetically sealed, laminated, barrier bag (TYVEK) and overpacked in a wooden box lined with foamed polystyrene. Elastomeric-bagged rounds packed in metal containers, with the desiccant on nose of projectile, are placed inside foamed polystyrene clamshells. The metal container is sealed by closing its lid.

3. Packaging is marked to identify the round and to provide information needed for shipping and storage. Markings on both inner and outer packs are given in table 2-2 (page 2-184).

## 2-75. 152-MM Conventional Ammo - continued.

Table 2-2. Markings on Packaging (Conventional Ammo)

| Markings | Wood Box or Metal Container | Fiber Container |
|---|---|---|
| Department of Transportation (DOT) shipping designation | X | |
| National stock number (NSN) and Department of Defense Identification code (DODIC) | X | |
| Department of Defense ammunition code (DODAC) | | X |
| Ammunition lot number | X | X |
| Gross weight of packing container and contents | X | |
| Cubical displacement of packing container | X | |
| Date manufactured | X | |
| Descriptive nomenclature of packed item | X | X |
| Caliber and Weapon designation | X | X |

e. Prior to Loading Vehicle. Because cartridges for 152-mm gun/launcher are fixed rounds, they require no preparation for firing except unpacking and inspection. Reject all rounds that fail to pass the inspection outlined below and return rejected rounds to ammunition supply point (ASP).

**NOTE: Save all packaging material in metal containers for repackaging of unserviceable rounds.**

1. Check markings on packing box to identify round.

**CAUTION: Don't use axes, crowbars, or other tools which could damage inner pack or ammo.**

2. Open outer pack.

3. Remove fiber container enclosed in laminated TYVEK bag or foamed polystyrene clamshell covered round from metal container.

4. Remove TYVEK bag from fiber container or remove foamed polystyrene clamshell from round.

5. Open fiber container.

## 2-75. 152-MM Conventional Ammo - continued.

CAUTION: Keep barrier bag on cartridge case. The ONLY time you remove this bag is after the round is on the loading tray when you chamber the round.

6. Remove cartridge (with barrier bag) and desiccant bags.
7. Check markings on projectile to confirm identification of rounds.
8. Visually inspect projectile for damage (dents or cracks) to projectile body, ogive, rotating band, and band coating which might result in difficulty in chambering, firing, or extracting.
9. Inspect for following conditions, any one of which is cause for rejection:
   - (a) Moisture on barrier bag and/or projectile. (Disregard humidity indicator on barrier bag.)
   - (b) Loose fitting barrier bag, that is, one allowing easy insertion of a pencil or the little finger of your hand without stretching the bag.
   - (c) Nicked or torn barrier bag.
10. Inspect for conditions below by feeling through barrier bag, any one of which is cause for rejection:
    - (a) Separation of cartridge case from projectile.
    - (b) Separation of cartridge case base from body.
    - (c) Open cracks in cartridge case.
    - (d) Presence of any loose material (which may be a chip of cartridge case flange, loose propellant, or other).

**NOTE: A ballistic protective cover is issued with your AR/AAV. Use it over barrier bag as additional protection for ammo stowed on board vehicle.**

f. Loading Vehicle. Before placing cartridge in stowage rack, unfold cuff of barrier bag so that it extends forward as far as possible, cover rotating band, then, fit ballistic protective cover over bagged cartridge.

## 2-75. 152-MM Conventional Ammo - continued.

g. Precautions in Firing.

NOTE: The lower firing temperature limit is -40°F for all rounds except HE-T cartridge XM657E2, which has a lower limit of +40°F.

NOTE: Ammo kept clean, dry, and at uniformly moderate temperatures gives greater accuracy of fire. Successive firing of cartridges from the same lot minimizes dispersion at target.

## 2-75. 152-MM Conventional Ammo - continued.

1. Assure that round is free of sand, mud, snow, ice, grease, or other foreign matter. Contamination may result in hot residue in gun chamber.

**NOTE: If temperature of barrier bag drops below $-25^{\circ}$F, barrier bag may become brittle and break when handled. If this happens, be sure that all barrier bag fragments are removed before chambering round.**

2. If cartridge is accidentally dropped, check by feeling thru barrier bag, for separation of base from body of cartridge case, and open cracks in case. Visually check for dented projectile and loose windshield (nose) cap.

3. Before firing canister cartridge M625 series, clear all personnel from dispersion area (figure 2-9). Firing over friendly troops is prohibited.

**NOTE: The canister M625 series cartridges are loaded with flechettes that function directly in front of gun muzzle. The dispersal pattern of the flechettes is shown in figure 2-9. For best results, with a target between 200 and 400 meters, elevate gun to 1200 meter graduation on gunner's telescope or periscope.**

NOTE: APPROXIMATELY A 10.5-METER INCREASE IN ARC WIDTH RESULTS FOR EACH ADDITIONAL 50 METERS OF RANGE.

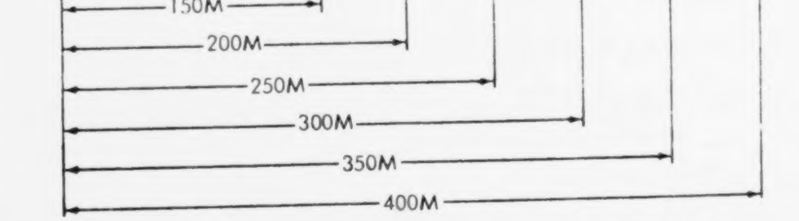


**Figure 2-9. 152-mm Dispersion-Pattern Canister Cartridge M625 Series**

**NOTE: Repeated loading and unloading of the same round may result in the separation of the ignition element from the round. No other attempt will be made to fire a round once it has been removed from the gun. Removed round will be checked for presence of ignition element. Vehicle commander will certify that missing ignition element does not constitute a hazard to crew.**

4. In case of misfire after performing misfire procedures of paragraph 2-50, step d. (starting on page 2-114), remove round and clean probe of firing mechanism.

5. Do not touch, move, or otherwise handle duds; their fuzes may be armed. Have duds destroyed in place by authorized minitions personnel only.

6. Never fire HE-T cartridge XM657E2 over friendly troops or through brush or other obstructions close to vehicle. The fuze XM720E1 on this round is very sensitive and could cause premature detonation.

h. Prepared for Firing But Not Fired.

1. Remove round (see steps 5. and 6. of paragraph 2-50, d. (on page 2-115).

2. If ammo is damaged:
    (a) Repackage ammo in original containers.
    (b) If original container is unsuitable, use expended packing material and transfer all markings.

**2-75. 152-MM Conventional Ammo - continued.**

(c) Conspicuously mark all layers of packing "UNSERVICEABLE" and cause of rejection on exterior of outer pack.

(d) Return to ASP for disposition.

i. Care and Handling.

1. General. Your ammo is carefully packed to protect it from exposure or damage during normal handling. If you handle it carefully and keep packing boxes from becoming broken or damaged, you won't be caught short when you need serviceable ammo. You won't have to repack unserviceable rounds for return to ASP! And remember:

   (a) Fuzes and primers are sensitive to shock. Protect them from hard knocks and blows, and from sources of electricity which could cause them to function accidentally.

   (b) Don't drop, drag, throw, tumble, or strike a round of ammo; packed or unpacked. It could damage the projectile, rotating band, windshield, and/or cartridge case or cause the fuze and primer to function.

   (c) Protect ammo from sources of high temperature (even direct sunlight), exposure to rain, excessive humidity, and ground moisture.

   (d) Protect unpacked cartridges from exposure to water or oil by:

      (1) Promptly repairing oil and water leaks in your vehicle.

      (2) Closing hatch covers and doors BEFORE hosing down outside of vehicle.

      (3) Removing from stowage racks before cleaning inside of vehicle.

      (4) Preventing oil or grease from contaminating ammo and stowage racks when lubricating internal parts of hull or turret.

2. Because the nonmetallic cartridge case is subject to easy burning:

   (a) Don't smoke in crew compartment (or anywhere near unpacked ammo).

## 2-75. 152-MM Conventional Ammo - continued.

(b) Protect case from sparks, open flame, burning residue, etc.

(c) Don't remove ballistic protective bags until you're ready to fire.

3. Because the cartridge case is nonmetallic:

(a) Watch your step when entering vehicle. Don't step on rounds stowed next to hatch.

(b) Don't drop the cartridge or hit it with anything that might puncture or dent the sidewalls.

(c) Don't get it wet.

(d) Don't break moisture seal on container until you're ready to use the round.

(e) Don't expose ammo to oil, grease, or any other type of foreign matter.

j. Inspection. Inspect unpacked, vehicle-stowed ammo every 3 months (during quarterly vehicle maintenance, if possible).

**NOTE: Do not remove elastomeric or neoprene barrier bag at any time during inspection.**

1. Move ammo from stowage rack to sheltered area outside vehicle.

**NOTE: If any of the following conditions are found, reject round, and return to ASP (Prepared For Firing But Not Fired, paragraph 2-75, step i. (starting on page 2-188).**

2. Inspect each round for:

(a) Combination of loose fitting barrier bag and moisture on barrier bag and projectile.

(b) Loose fitting barrier bag and nicks and tears in bag.

(c) Separation of cartridge case from projectile.

(d) Separation of cartridge case base from body.

(e) Open cracks in cartridge case.

(f) Dents in projectile body and ogive.

(g) Damaged rotating band. (More on next page).

## 2-75. 152-MM Conventional Ammo - continued.

(h) Presence of any loose material (which may be a chip of cartridge case flange, loose propellant, or other).

3. If barrier bag is not loose fitting and moisture is found on bag and/or projectile, wipe dry with a clean cloth or paper towels. Return to service.

## 2-76. 152-MM Guided Missile.

a. Firing Tables and Precautions. See FT 152-A-1. For general precautions see TM9-1300-206 and AR 385-63. For missile identification, shipping and storage, and service data, see tables 2-3 through 2-6, respectively (starting below). See figures 2-10 and 2-11 (page 2-193) for identification of surface attack and practice type missiles. See figure 2-12, on page 2-194 for missile inspection points.

Table 2-3. Guided Missile Identification NSN and Part Number

| TYPE | MODEL | NSN | Part No. |
|---|---|---|---|
| Surface attack | MGM-51A | 1410-00-999-0857 | 0070000 |
| | MGM-51B | 1410-00-878-7219<br>or<br>1410-00-150-8932 | 10154031 |
| | MGM-51C | 1410-00-878-7219<br>or<br>1410-00-150-8932 | 10153399 |
| Practice | MTM-51A | 1410-00-999-0132 | 10121359 |
| | MTM-51B | 1410-00-878-7218<br>or<br>1410-00-150-8940 | 10153071 |
| | MTM-51C | 1410-00-878-7218<br>or<br>1410-00-150-8940 | 10153400 |

NSN applies to missile and container as a unit of issue.

## 2-76. 152-MM Guided Missile - continued.

Table 2-4. Guided Missile Identification - Color

| Nomenclature | Surface attack | Practice |
|---|---|---|
| Missile: rocket motor section[1] | Olive-drab | Olive-drab |
| Markings | Yellow | White |
| Nose cone | Black with 2-inch yellow band | Olive-drab with 2-inch blue band [2] over olive drab |
| Container: overall | Olive-drab | Olive-drab |
| 4-inch corner squares [3] | Yellow | Brown |
| Markings | Yellow | White |

[1] Live rocket motor will have a 2-inch brown band around the motor case.

[2] The word INERT is stamped on the blue band in four places, 90° apart.

[3] Container corner markings are on diagonally opposite corners.

Table 2-5. Guided Missile Identification - Shipping and Storage

| Nomenclature | Surface attack | Practice |
|---|---|---|
| ICC shipping name on container | ROCKET AMMUNITION WITH EXPLOSIVE PROJECTILE | ROCKET AMMUNITION WITH INERT LOADED PROJECTILE |
| Shipping classification | CLASS A EXPLOSIVE | CLASS B EXPLOSIVE |
| Quality distance classification | 7 | 2 |
| Storage compatibility group | F | F |

2-76. 152-MM Guided Missile - continued.

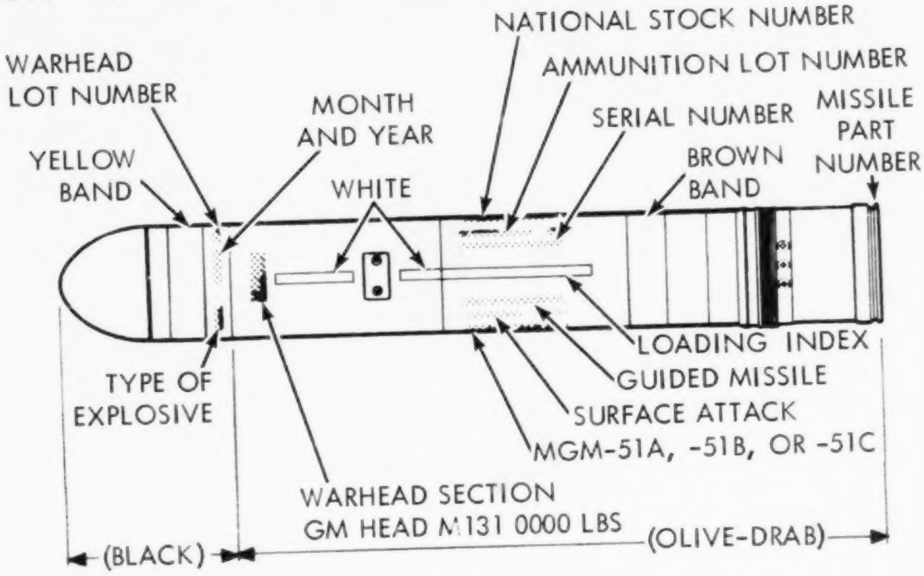

NATIONAL STOCK NUMBER
WARHEAD LOT NUMBER
AMMUNITION LOT NUMBER
MONTH AND YEAR
SERIAL NUMBER
MISSILE PART NUMBER
YELLOW BAND
WHITE
BROWN BAND
LOADING INDEX
GUIDED MISSILE
TYPE OF EXPLOSIVE
SURFACE ATTACK
MGM-51A, -51B, OR -51C
WARHEAD SECTION GM HEAD M131 0000 LBS
(BLACK)
(OLIVE-DRAB)

Figure 2-10. Surface Attack Missile Identification

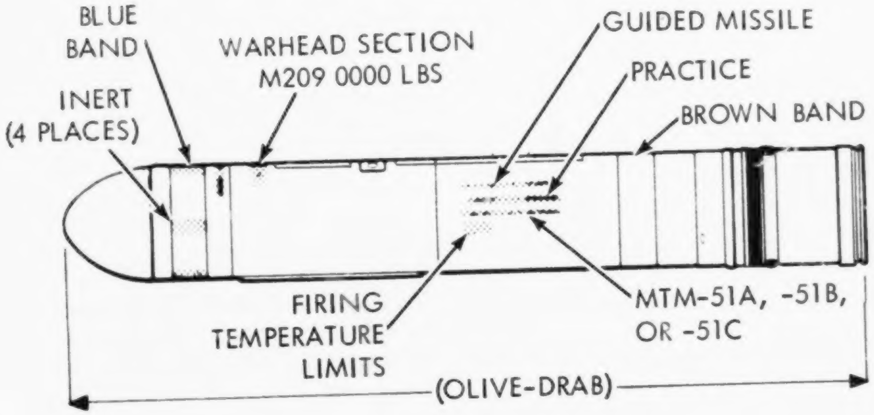

BLUE BAND
WARHEAD SECTION M209 0000 LBS
GUIDED MISSILE
PRACTICE
INERT (4 PLACES)
BROWN BAND
FIRING TEMPERATURE LIMITS
MTM-51A, -51B, OR -51C
(OLIVE-DRAB)

Figure 2-11. Practice Missile Identification

## 2-76. 152-MM Guided Missile - continued.

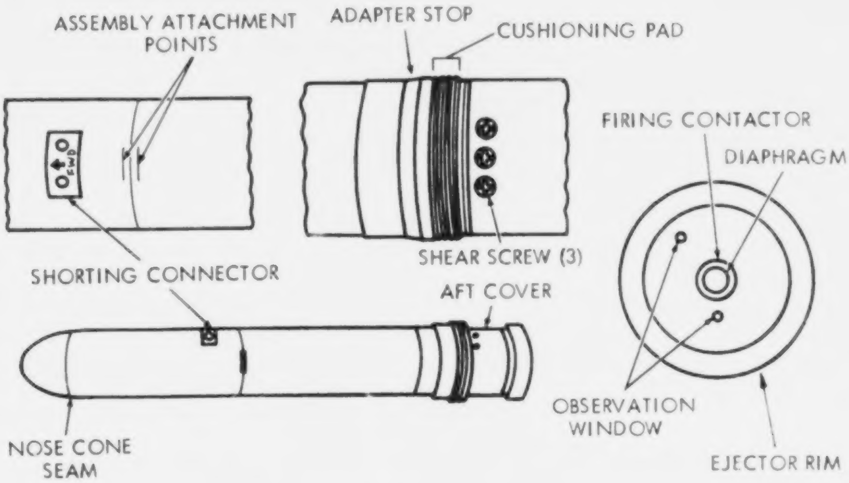

ASSEMBLY ATTACHMENT POINTS
ADAPTER STOP
CUSHIONING PAD
FIRING CONTACTOR
DIAPHRAGM
SHEAR SCREW (3)
SHORTING CONNECTOR
AFT COVER
OBSERVATION WINDOW
EJECTOR RIM
NOSE CONE SEAM

Figure 2-12. Missile Inspection Points

Table 2-6. Service Upon Receipt of Missiles

| Item | Action required |
|---|---|
| MISSILE CONTAINERS: | |
| Data marking and color coding . . | Make sure correct type of missile has been received. |
| Lead seals . . . . . . . . . . . . . . . . | Must not be broken from latches. |
| Surfaces . . . . . . . . . . . . . . . . . | Must not be punctured.<br>**NOTE: If containers are defective; do not open. Return missile and container to ASP. Report discrepancies on DA Form 2415.** |
| MISSILES . . . . . . . . . . . . . . . . . . | REMOVAL<br>**NOTE: Except to perform inspections required in table 2-7, (page 2-197) missile containers must not be opened until immediately prior to stowing missiles in vehicle.** |

## 2-76. 152-MM Guided Missile - continued.

Table 2-6. Service Upon Receipt of Missiles - Continued

| Item | Action required |
|---|---|
| MISSILES - continued | 1. Depress pressure relief valve on container lid to relieve any pressure.<br>2. Cut seals; unlatch and remove container lid.<br>3. Remove missile from container.<br>**NOTE: Exercise care to avoid denting or damaging missiles.**<br>**CAUTION: If humidity indicator "40" or "50" dot is pink, return missile and container to ASP.**<br>4. Visually inspect missile container for moisture. If an accumulation of moisture is present, return missile and container to ASP.<br>5. Replace lid on container.<br>6. Return all containers, that are excess to unit requirements to ASP. |
| Surface | INSPECT (FIG 2-12, ON PAGE 2-194)<br>Must not be dented, cracked, scratched, or corroded.<br>**WARNING: Reject all HEAT warhead missiles that have dented nose cones.**<br>**NOTE: Scratches that have not displaced metal are permitted.** |

## 2-76. 152-MM Guided Missile - continued.

Table 2-6. Service Upon Receipt of Missiles - Continued

| Item | Action Required |
|---|---|
| Shorting connector | Must fit tight and its surface must not be higher than surface of missile skin. FWD arrow must point toward nose cone. |
| Assembly attachments points | All must fit tight and joints at attachment points must not be loose. |
| Nose cone seam | Must not be separated. |
| Color coding and data markings | Make sure correct type of missiles has been received. |
| MISSILE AFT COVER: | |
| Shear screws | Must be tight. |
| Ejector rim | Must not be dented. |
| Adapter stop | Must not be dented. |
| Cushioning pads | Not rolled or defaced. |
| Observation windows | Tight and not cracked. No evidence of internal moisture. |
| Firing contactor | Must fit tight. |
| Diaphragm | Sealed and has no punctures. |

**NOTE: If missile fails to pass any of the above checks, repack missile in its container and return to ASP. Report on DA Form 2415.**

## 2-76. 152-MM Guided Missile - continued.

Table 2-7. Guided Missile Periodic Inspections

| Item | Inspect |
|---|---|
| **NOTE: Semiannual inspection will be performed by a contact team from the ammunition company. Notify supporting organization where inspections can be scheduled.** | |
| MISSILE CONTAINERS:<br>Humidity indicator | Inspect the humidity indicator on all containers on a monthly basis (table 2-6). |
| MISSILE AND CONTAINER: | Semiannual visual inspection and missile test will be conducted on a sample basis for missiles not removed from storage containers.<br>Semiannual visual inspection and missile test will be conducted on all missiles subjected to tank environment.<br>Semiannual visual inspection on a sampling basis of basic load stock.<br>Annual missile test on a sampling basis of basic load stock. |
| DUMMY GUIDED MISSILE:<br>M29 and M29A | Semiannual visual inspection will be performed on all dummy missiles. |

## 2-77. Grenade Launcher M176.

a. Description. The grenade launcher contains a WP-filled smoke grenade M34 and a AN-M8 HC-filled smoke grenade (figure 2-13, on page 2-198). The safety pins are removed from both of these grenades at assembly. Once launcher is fired, the cover and holder separate allowing the grenades to explode.

b. Use. The grenade launchers are used primarily to provide a smoke screen for concealing tactical maneuvers. The exploding and incendiary action of the WP-filled grenade M34 provides a secondary capability of producing casualties.

## 2-77. Grenade Launcher M176 - continued.

c. Markings.

1. Grenade launcher (figure 2-14, below). The tube of the launcher is painted olive-drab with one 1/2-inch yellow band and one 1-1/2 inch light green band. "WP" and "HC" is marked in red on the light green band. "GRENADE LAUNCHER M176" and "LOT NO. 0000-00-0000" are marked in red on the olive-drab below the light green band.

2. Shipping box. A color code is located on two diagonally opposite edges of the box. Yellow identifies high-explosive ammunition, light green identifies smoke ammunition, and light red identifies incendiary ammunition.

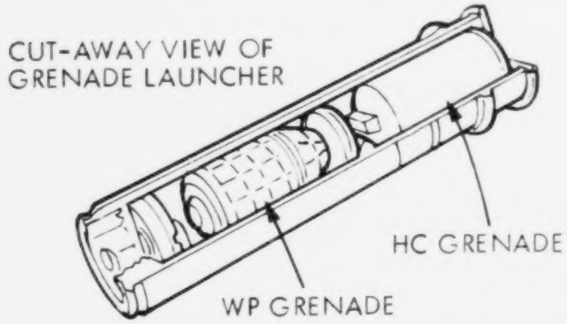

CUT-AWAY VIEW OF GRENADE LAUNCHER
HC GRENADE
WP GRENADE

**Figure 2-13. Components of Grenade Launcher M176**

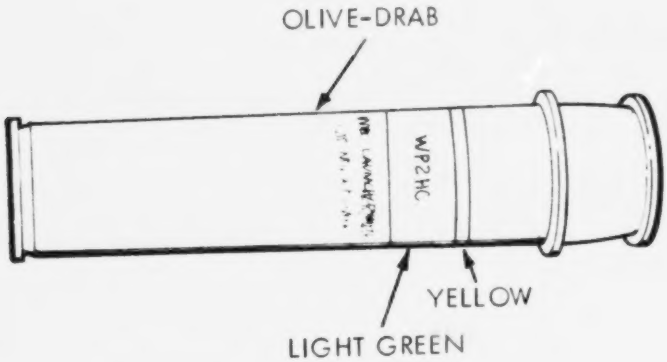

OLIVE-DRAB
WP2HC
YELLOW
LIGHT GREEN

**Figure 2-14. Grenade Launcher M176 Markings**

d. Packaging and Packing.

WARNING: Do not open or repair a damaged grenade launcher shipping box, shipping container, or damaged launcher tube. Isolate the box, container, or tube and notify EOD personnel immediately.

WARNING: Always use caution when opening a grenade launcher shipping box or shipping container.

WARNING: Always handle a grenade launcher as an armed, high explosive, incendiary munition.

WARNING: Never place any portion of the body in front of either end of a grenade launcher.

WARNING: Never attempt to disassemble a grenade launcher or sabot assembly. The safety pins are removed from the grenades when launcher is assembled.

WARNING: Do not use a grenade launcher that has been hit by small arms' fire or has cracks, dents, or other deformities. Isolate these launchers and notify EOD personnel immediately.

## 2-77. Grenade Launcher M176 - continued.

1. PBA-1 series lots. Each grenade launcher is packaged in a spirally wound fiber ammunition shipping container. Chipboard and felt filler pads are placed in the container, as required, to keep launcher from moving within the container. Pressure-sensitive tape holds cover in place. Eight launchers are packed, four to a layer, in a nailed wood shipping box that has metal strapping. Filler pads are placed in the shipping box, as required, to insure a tight pack. Each end of the wood shipping box contains a rope handle.

2. PBA-2, PBA-3, and PBA-4 series lots. Eight launchers are packed in two rows of four each into a cleated plywood box. The box contains fiberboard packaging and interlocking partitions. The nailed wood box has two steel straps.

3. PBA-5 and subsequent series lots. Eight launchers are packed in two rows of four each in a three-piece plastic foam box. The foam box is held together with tape and is packed in a wirebound wood box that is closed with metal strapping and wire.

e. Firefighting. Unless the grenades are deficient, it's almost impossible for a grenade launcher to self-ignite. However, should a box of launchers catch fire it's likely the launchers will ignite. If you have a fire remember the following:

   1. The launcher was designed to project grenades a maximum distance of 150 feet, with the possibility of a maverick going 200 feet. Also, when WP grenade M34 explodes, shrapnel can be thrown for a distance greater than 150 feet. Therefore, to prevent injuries, maintain a restricted radius of 1000 feet from the source of the fire.

   2. Water, continuously applied, will extinguish burning WP and control burning HC. However, since HC burns without atmospheric oxygen, there is no way of extinguishing it. Therefore, apply water or appropriate fire extinguisher to contain the fire and prevent burning HC from igniting other materials. Then notify EOD personnel.

# CHAPTER 3
# MAINTENANCE INSTRUCTIONS

## Section I. LUBRICATION

### 3-1. Service Intervals - Normal Conditions.

a. Hull/vehicle lubrication. Refer to LO 9-2350-230-12.

b. Turret components and armament. Refer to LO 9-2350-230-12.

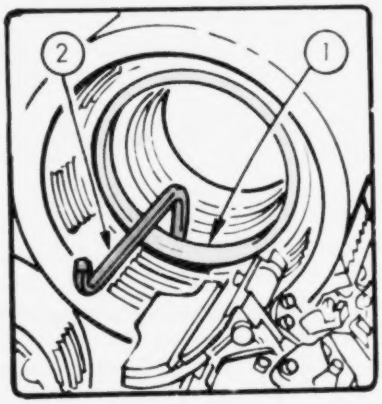
### 3-2. Service Intervals - Unusual Conditions.

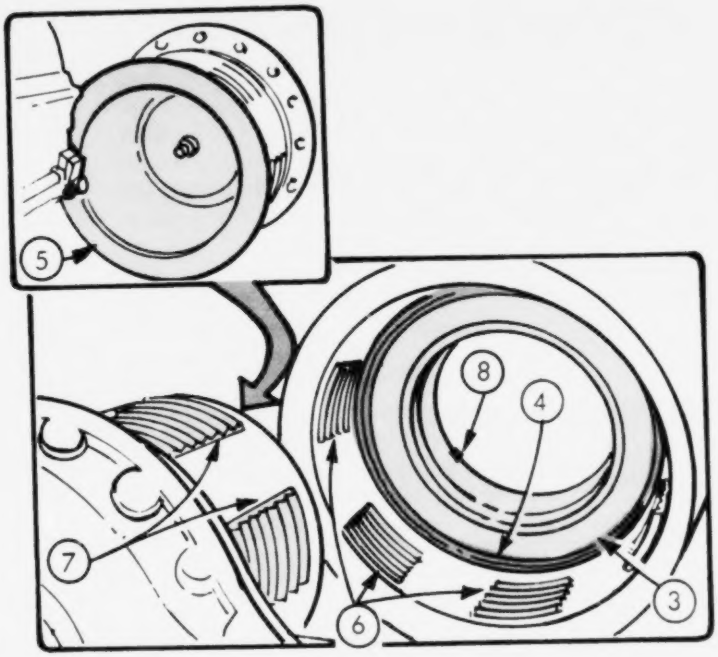
Lubricate as needed to compensate for abnormal operation and extreme conditions, such as high or low temperatures, prolonged periods of highrate operation, continued operation in sand or dust, or exposure to moisture. Lubrication intervals may be extended during inactive periods.

### 3-3. Gun/Launcher Cleaning and Lubrication.

a. Daily. After completion of firing mission, clean the gun/launcher as follows:

1. Open breech and remove obturator seal (1) with offset screwdriver 5120-00-287-2130 (2).





2. Saturate a clean, soft rag with RBC and wipe residue and dirt from obturator seal (1), rear face of gun tube (3), seal cavity (4), breech chamber and firing probe of firing mechanism (5), buttress threads of coupling (6), buttress threads of breech chamber (7), detent hole (8), and all exposed areas.

**NOTE: Do not use steel wool.**

3. With a clean soft rag, remove all traces of RBC.

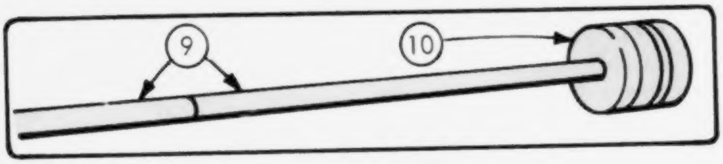
4. With a clean rag or brush saturated with PL-S, spread an even coat of oil on all areas cleaned above.

5. Check all areas for cleanliness. Install obturator seal (1), snap into place.

**NOTE: Make sure that buttress threads of coupling (6) and breech chamber (7) are well lubricated (paragraph 3-3, step b, starting on page 3-3).**

WARNING: The obturator seal must be used with all types of ammo to prevent a fire hazard and gas wash.

**3-3. Gun/Launcher Cleaning and Lubrication - continued.**

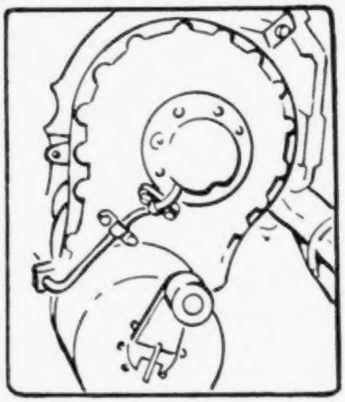


6. Assemble your staffs 1090-00-563-7232 (9) and insert through outside (muzzle end) of tube. Position bore brush 1025-00-189-5762 (10) at breech end and install to staffs. Saturate bore brush with RBC and pull staff-bore brush out from muzzle end. Repeat until gun tube is clean.

7. With a clean, soft rag, using staff bore brush, remove all traces of RBC.

8. With a clean rag, saturated with PL-S, using staff-bore brush, spread an even coat of oil on cleaned surfaces of gun tube.

9. Hand crank breech open and closed a couple times -- check for smooth operation.

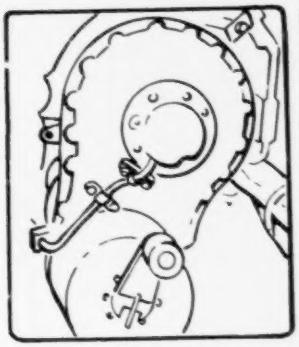


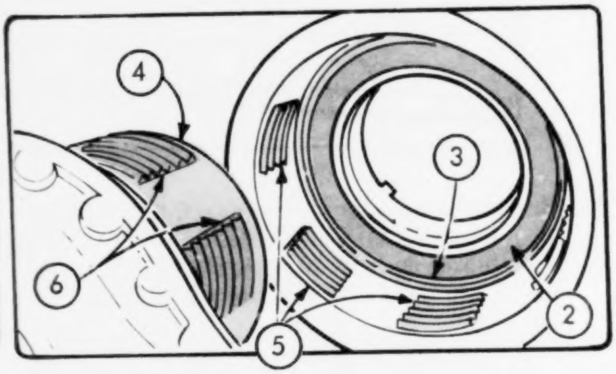
10. Depress gun tube fully. Leave breech backed-out, but not rolled over, at about 12 o'clock lockout position when vehicle is stationary . . . this will prevent moisture drainage into tube and allow circulation to cut down condensation. But when you're on the move close the breech tight to keep dust out.

11. Before firing, wipe dry all areas lubricated at step 4 (on page 3-2) and step 8 on page 3-3), EXCEPT coupling buttress threads (6) and breech chamber threads (7); keep these threads lubricated.

12. Repeat steps 1 through 10 for the next two days following firing.

13. On the third day, again clean gun bore with RBC. With RBC and a nonscratch pad or stiff bristle brush, clean obturator seal (1), rear face of gun tube (2), seal cavity (3) -- DON'T USE STEEL WOOL - breech chamber and firing probe of firing mechanism (4) and also (5) on page 3-2, buttress threads of breech chamber (6), detent hole (8) on page 3-2 and all exposed areas. MAKE SURE ALL POWDER-CONTAMINATING SURFACES ARE CLEANED.





b. Cleaning and Lubricating Gun/Launcher When Not Used For Extended Periods.

**CAUTION: Do not clean bore with abrasives.**

1. Repeat steps 1 through 9 (paragraph 3-3. a., page 3-1).
2. Coat all surfaces, cleaned at step (1) above, with PL-S. If the gun won't be fired for a month or longer, use GIA. Spread the oil/grease with a clean saturated cloth or brush.
3. Depress gun tube fully. Leave breech backed out, but not rolled over, at about 12 o'clock lockout position . . . this will prevent moisture drainage into tube and allow circulation to cut down condensation.
4. Every month, if the gun still has not been fired, clean with RBC and wipe dry. Then lubricate as at step (4) above.
5. Before firing, wipe dry all areas lubricated EXCEPT the buttress threads . . . always keep these threads lubricated.
6. At all times keep recoil mechanism pressurized . . . unless maintenance requires depressurization.

**NOTE: If you have the M81 MOD, get the organizational turret mechanic help you clean the bore evacuator (LO 9-2350-230-12). Failure to clean it could cause a flareback during firing. Clean it for three days in a row every time you fire.**

## Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

### 3-4. Maintenance (Normal Conditions).

a General. The PMCS detects electrical and/or mechanical failures. These failures are then corrected or reported to organizational maintenance before expensive and time-consuming repairs are required. PMCS are accomplished by the crew under supervision of their tank commander.

b. Specific Procedures. Specific PMCS to be performed are listed in table 3-1. When performing these checks and services, enter on DA Form 2404 the item number and malfunction beyond your scope to repair.

c. Before You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform all your before (B) PMCS.

d. While You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform all your during (D) PMCS.

e. After You Operate. Be sure to perform all your after (A) PMCS.

f. Monthly Checks. There are four monthly (M) PMCS to perform.

g. In What Sequence: Check all items:
B's (before) B1 through B117
D's (during) D1 through D18
A's (after) A1 through A74
M's (monthly) M1 through M4
(Enter items on DA Form 2404 as B4, D10, A70, M3.)

h. Is Your Equipment Ready or Not Ready? The column "For Readiness Reporting, Equipment Is Not Ready/Not Available If" tells what causes your equipment to be rated "ready or not ready" (go or no-go) because it can't perform its primary mission.

### 3-5. Maintenance (Unusual Conditions).

a. Vehicles exposed to extreme cold or hot weather will require more frequent servicing. Materiel subjected to salt-water immersion should be evacuated to organizational maintenance as soon as possible after exposure.

b. When operating under dusty conditions or on sandy terrain, flush the bilge pump system frequently and thoroughly to prevent accumulation of silt and debris in outlets, at inlets, and/or pump impellers. Operate each pump several minutes, with an adequate supply of water, to properly flush the system. Erect surfboard to flush surfboard cavity inlets. Check lower inlets of all pumps for any accumulation of debris or mud.

## Table 3-1. Preventive Maintenance Checks and Services

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| 1 | | | | LOG BOOK | Review DA Forms 2404, 2408-1, 2408-5, and 2408-14 for MWO's, parts on order, incomplete work, and status symbol. | An urgent MWO not applied. |
| 2 | | | | VEHICLE | Make a visual inspection of the vehicle for signs of leaks (fluid spots on the ground), damage, or pilferage that may have occurred after the vehicle was parked. | |
| | 1 | 1 | | Road Wheel Hubs, Idler Wheel Hubs, Sprocket Hubs, and Shock Absorbers | During halts and after operation, feel hubs and shock absorbers. An overheated hub indicates poorly adjusted, poorly lubricated, or damaged bearings. The bottom of the shock absorbers should feel warmer than the hull -- if not warmer, they are not working. | Hub "frozen" or unserviceable. |
| | | 2 | | Cleaning the vehicle as required | Clean interior and exterior of vehicle. Use water hose on exterior only. Avoid directing stream at areas where it will enter fire control or armament openings, vehicle interior, engine exhaust system, or personnel heater outlet. Do not use water, diesel fuel, gasoline or similar fluids to clean electrial cables or components. | |
| | | | | SUSPENSION SYSTEM | Inspect entire suspension system for excessive wear, damage, and looseness. | |

| B. | .D. | .A. | .M | | | |
|---|---|---|---|---|---|---|
| | | 3 | | Road Wheels | Inspect for base separation or chunking of rubber which caused a "thumping" during operation. | More than one road wheel bent, missing, or broken. Cracks extend across entire width of tread surface; chunking exceeds more than half the width of the tire; or bolt holes are elongated. |
| | | 4 | | Sprockets, Idler Wheels, and Carrier Wheels | Inspect for cracks, missing teeth, or loose bolts. | Sprocket or idler wheel cracked, bent, or teeth missing. |
| 3 | | | | Torsion Bars | Place crowbar under 2nd, 4th, and 5th road wheel from the front and pry down to detect broken torsion bars. Broken front torsion bars may be detected by the absence of the sharp angle as the track passes under the road wheel.<br>**NOTE: On number 3 road wheel, pry wheel down from the rear of the vehicle.** | One or more torsion bars or roadwheel arms bent, missing, or broken. |
| | | 5 | | Track | Check track tension with canteen cup directly over number 3 road wheel. Sag in track between idler and sprocket must be kept between 3-1/2 and 4 inches. Check for broken shoes, center guides, and missing pads. Make sure that track pins do not extend past shoe wells. Check pins for 2 or 3 threads showing past end of nut. | Broken shoe or pin, two guides broken on same shoe, three guides in a row missing or broken. |
| | | 6 | | Hydraulic Track Adjuster | Check for dents or leaks. | Track adjuster missing, bent, or leaking. |
| | | | | HULL (Exterior) | See next page | |

## Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| | | 7 | | Lights | Check operation; inspect lens for discoloration, damage, or moisture. Check operation of infrared lights by placing hand on lens. Heat will be noticeable if light is operating.<br>**NOTE: Check low infrared-beam then check high beam.** | |
| | | 8 | | Towing Shackels | Check for damage, missing pins, or retainer clips. | |
| | | 9 | | Fire Extinguisher, Exterior Handle | Check for damage, loose, or missing parts, check seal and seal wire. | |
| | | 10 | | Hull Access Plugs | Make sure all five hull-access plugs are installed and secure. | When amphibious operations are expected, one or more missing plugs. |
| 4 | | 11 | | Water Barrier when amphibious operations are expected | Check for damage. | When amphibious operations are expected, unserviceable water barrier. |

| B. | .D. | .A. | .M | | | |
|---|---|---|---|---|---|---|
| | | 12 | | Grill Doors | Check for operation and damage. | Grill door missing. |
| | | 13 | | Exterior Stowage of Basic Issue Items and Support Items | Check for presence and condition. | |
| | | | 1 | Batteries | Check electrolyte level and vent holes on caps; check for corrosion and make sure a light coat of grease is on battery terminals. Check all components for tightness. Add water if electrolyte is low.<br>**NOTE: When adding water to electrolyte at temperature below 32°F, start engine and run for 15 minutes to allow water to mix with electrolyte.** | One or more missing batteries. Batteries will not crank engine. |
| | | | | ENGINE COMPARTMENT | | |
| | | | | | **WARNING: Contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel.** | |
| | | 14 | | Air Cleaner | Check air restriction indicator. If red, clean filter element. Check condition of hoses and connections.<br>**NOTE: Under severe dust conditions, loss of engine power or excessive black exhaust smoke may indicate need for more frequent checks of restriction indicator and servicing.** | Canister, filter, or hoses missing or damaged. |

### Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures<br>Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| 5 | | | | Surge Tank | a. Check coolant level. Make sure coolant is up to return tube level which coincides with cold-level mark.<br>b. Check hoses for leaks. Check cap gasket and safety chain. Check that surge tank cap is securely locked.<br>**CAUTION: Remove cap slowly to release pressure when engine is hot.**<br>**NOTE: Check antifreeze tag during cold weather to make sure protection is adequate. If coolant is added or tag is missing, have maintenance personnel re-check level of protection.** | Cooling system leaks, or surge tank cap is loose or missing. |
| | | 15 | | Fuel Tanks | Re-fuel vehicle. Fill each tank to 3 inches below filler neck while parked on level ground. | |

| B. | D. | A. | M |  |  |  |
|---|---|---|---|---|---|---|
| 6 |  | 16 |  | Engine & Crew Fixed Fire-Extinguishers. | a. Check for damaged seal wire. | Broken or missing seal wires or seals. |
|  |  | 17 |  |  | b. Check for defects in cylinder mounting brackets, control mechanism, discharge lines and nozzles. |  |
|  |  | 18 |  | Generator/Fan-Drive and Coolant Belts | a. Check water-pump belt adjustment and condition. Belt deflection should be about 1/4-inch. | One or more belts missing or unserviceable. |
|  |  | 19 |  |  | b. Check generator/fan-drive belt condition and adjustment. Have maintenance personnel replace belts if tension adjuster is less than 1/4-inch from stop. Check oil level. See LO 9-2350-230-12. | One or more belts missing or unserviceable. |
| 7 |  |  |  | Fuel Filters and Fuel Lines | Drain condensation from each filter, not to exceed 1/4-pint. If water or trash continues to come from filters, start engine to refill filters. Continue until clear fuel runs from filter. Check for fuel leakage. | Any fuel leakage. |
| 8 |  |  |  | Engine Air-Box Flame Heater (Only during cold weather operations). | Make sure indicator is in precharge area. Open fuel shut-off valve (if present) unlock handle, and pump up to cold start area. Lock handle and shut off fuel valve.<br>**NOTE: Check accumulator pressure only when temperature is below 32°F.** |  |
| 9 |  |  |  | Engine Oil Level Indicator | Before starting engine, make sure oil level is between FULL and LOW mark. |  |

## Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures<br>Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| 10 | | | | Transmission Oil Level Indicator | Before starting engine, make sure oil level is within operating range. | |
| | 2 | | | Exhaust System | Check for evidence of exhaust leaks. | Excessive leakage or missing components. |
| | | | | DRIVER'S COMPARTMENT | | |
| 11 | | | | Actuating Handle for Engine & Crew Fixed Fire Extinguishers | a. Check seal wire. | Broken or missing seal wires or seal. |
| 12 | | | | | b. Check that cylinders have not been discharged. Cylinders have been removed and weighed within the past 90 days.<br>**NOTE: Upon removal of cylinder to be weighed at 90-day interval period, make sure actuating handles are pulled and check plunger on head of engine compartment fire-extinguisher cable. Make sure that cable works smoothly in and out for crew compartment fixed fire extinguisher.** | |

| B. | .D. | .A. | .M |  |  |  |
|---|---|---|---|---|---|---|
| 13 |  |  |  | Personnel Heater (as required) | a. Check fuel lines and pump for fuel leaks. |  |
| 14 |  |  | 2 |  | b. Check operation and exhaust leaks. See Note below.<br>**NOTE: This will be a monthly check during warm weather.** |  |
|  |  | 20 |  | Driver's Hatch Cover | Must lock securely in open and closed position. Check latch and seals for damage and wear. | Driver's hatch cover missing or locking mechanism inoperative. |
|  |  | 21 |  | Driver's Escape Hatch | Check for presence of hatch and make sure locking mechanism is secure. | Escape hatch missing or locking mechanism inoperative. |
|  |  | 22 |  | Driver's Seat | Examine seat for loose nuts or screws and for proper mounting and operation in all positions. | Seat is missing or inoperative. |
|  |  | 23 |  | Ammo Racks & Ammo Case Protective Covers | Check ammo racks, clamps and catches for serviceability. Make sure pads are present. Check ammo case protective covers for serviceability. | Six unserviceable racks in any combination in both the driver's compartment and turret, or insufficient number of serviceable ammo case protective covers for all consumable cartridge case ammo to be carried. |

Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| 15 | 3 | | | Driving & Brake Controls | Inspect and operate the steering, shift, brake, and accelerator controls for any binding or excessive play in linkage.<br>**CAUTION: Make sure steer selector is in LAND position.** | Broken or binding linkages or controls. Inoperative brakes or steering. |
| 16 | | | | Bilge Pumps | Check operation. Turn on master switch and front and rear bilge pumps one at a time. Have another crewman place hand over outlets and feel for flow of air. | When amphibious operations are anticipated: front bilge pump inoperative or both rear bilge pumps inoperative. |

| B. | .D. | .A. | .M | | | |
|---|---|---|---|---|---|---|
| 17 | | | | Switch and Indicator Panel | Check the following:<br>a. Battery Gauge. Should be in high yellow area. | Engine or transmission low oil-pressure warning light, or transmission oil-temperature warning light missing or inoperative. Both engine temperature-gauge and engine temperature-warning-light are missing or inoperative. |
| 18 | | | | | b. Engine & Transmission Warning Light. Should light when the master switch is on. | |
| 19 | | | | | c. For hydrostatic lock (page 2-14.2). | |
| 20 | 4 | | | | d. Start Engine. Look for normal readings and operation of gauges, instruments, warning lights, and indicator lights. Check for unusual noise and vibration. | |
| 21 | | | | | e. Make sure air-cleaner motor is operating by placing hand over discharge tubes and feel for air exhausting out. | |
| | | | | M47 Periscopes | Check the following: | |
| 22 | | | | | a. Periscopes for cracks, scratches, and visibility. | More than two M47 periscopes unserviceable or missing. |
| 23 | | | | | b. All components of the wiper assembly are functioning properly. | |
| 24 | | | | | c. Condition of reservoir and mount assembly. Refill as required. | |
| | | | | TURRET (Exterior) | **NOTE: Turret items without asterisk (*) will be checked only when use of the turret and firing system is anticipated, and in conjunction with monthly combat checks. Turret items with asterisks (*) will always be checked** before vehicle operation. | |

Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| 25 | | | | M48 Periscopes | During hours of darkness, check operation of periscope with IR driving headlights. | Periscope is inoperative. Will not focus. Damaged vehicle power supply cable. |
| 26 | | | | Exterior Stowage* | Check condition and stowage of exterior items. | |
| 27 | | | | Gun/Launcher Tube | a. Make sure that tube is wiped dry and check for obstructions. | Obstructions in tube. |
| | | 24 | | | b. Check for powder fouling, corrosion, and other damage. | |
| 28 | | 25 | | | c. Check your DA Form 2408-4 to determine remaining EFC life. Have tube borescoped as required. | No EFC rounds remaining. |
| 29 | | | | Grenade Launcher Tubes | a. Check for bent, dented, corroded, and damaged tubes. | |
| | | 26 | | | b. Check cleanliness of tubes. Make sure that a light coat of oil is applied inside the tubes. | |
| 30 | | | | | c. Check operation of solenoids and make sure they are free of oil. | |

*See NOTE page 3-15.

| B. | .D. | .A. | .M | | |
|---|---|---|---|---|---|
| 31 | | | | Cal .50 Machine Gun | **WARNING: Make certain machine gun is clear of ammo and barrel is free of obstructions.** |
| 32 | | | | | a. Check pintle support assembly for missing pins and for tightness of all fastenings and operating parts. |
| 33 | | | | | b. Operate ammo-box locking cam. When locked, ammo box must be steady and secure. |
| 34 | | | | | c. Check mount for presence and its condition. Hand function weapon to make sure of proper assembly and operation. |
| 35 | | | | Cal .50 MG Headspace & Timing | a. Check and adjust as necessary. |
| | | 27 | | | b. Clean and lubricate weapon |
| 36 | | | | Night Vision Sight (Cal .50 MG) | Reference TM 11-5855-203-10 (AN/PVS-2) and TM 11-5855-202-13 (AN/TVS-2) for PMCS. |
| 37 | | | | Infrared Search Light AN/VSS-3 or AN/VSS-3A | Securely mounted. Proper function. Perform PMCS in accordance with TM 11-5855-217-12 for AN/VSS-3 or TM 11-5855-217-12-1 for AN/VSS-3A. |
| | | | | COMMANDER'S CUPOLA | |

## Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| 38 | | 28 | | Hatch Doors* and Seals | Open and close hatch doors. Check for secure locking. Check seal and pad for wear/deterioration. | Hatch missing or will not latch or lock. |
| | | 29 | | Ballistic Shield | Secure mounting. | |
| 39 | | | | Fire-Extinguisher Switch | Make sure seal wire and seal not broken or missing. | Seal wire or seal broken or missing. |
| 40 | | | | Portable Fire-Extinguisher | Make sure tag does not exceed 90 days. Make sure safety wire and seal not broken or missing. Check that horn (nozzle) is not loose. | Seal wire or seal broken. |
| | | 30 | | Vision Blocks | Check for bad seals. Check glass for cloudiness, scratches, and pits. Check for separation. | |
| | | 31 | | Electrical Contact Ring | Inspect and clean with dry cloth, as needed. | |
| | | 32 | | Wiring Harness | Make sure electrical connectors are tight and undamaged. Check for cuts and broken wires. | |

*See NOTE Page 3-15

|  | B. | .D. | .A. | .M |  |  |  |
|---|---|---|---|---|---|---|---|
| 41 |  |  |  |  | Traverse Mechanism | a. Check for loose bolts. |  |
| 42 |  |  |  |  |  | b. While manually traversing full circle, check for free movement and minimum backlash. Now, with full power, traverse full circle in each direction using both machine gun traverse switches and CUPOLA ROTATION switch. Cupola should not coast after releasing switches. |  |
| 43 |  |  |  |  | Traverse Mechanism (M551A1 Only) | a. With cupola power on, make sure loader is clear, then traverse cupola from CUPOLA ALIGN switch and from remote align switch. After each cycle, check to make sure index pointers are aligned (within 1-inch either way). Traverse cupola in both directions. |  |
| 44 |  |  |  |  |  | b. With cupola power on, traverse cupola approximately 90° from front position, actuate CUPOLA ALIGN switch and then remote align switch to STOP ALIGN position during each cycle. Check to make sure cupola stops traversing. Check both directions from front. |  |
| 45 |  |  |  |  | Loader's Periscope Stop (M551A1) | Rotate periscope mount in both directions, check to make sure the periscope stop does not by-pass pin. Also check for loose or missing parts. |  |
| 46 |  |  |  |  | Loader's Hatch Cover* | Check seal and pad for wear and damage. Open and close hatch cover to see that cover locks securely at open and closed positions. | Missing or will not latch or lock open. |

*See NOTE Page 3-15

## Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures<br>Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| | | 33 | | Ammo Racks, Protective Screens, and Ammo-Case Protective Covers | Check safety lock pins securing vertical ammo racks and screens to turret ring. Make sure racks and screens are installed correctly.<br>Check ammo arms, clamps, and catches for serviceability. Make sure pads are present and installed. | Six unserviceable racks in any combination in both the driver's compartment and turret, or insufficient number of serviceable ammo-case protective covers for all consumable cartridge case ammo to be carried. |
| | | 34 | | Floor Access | Remove cover. Slowly traverse turret to inspect and clean out all debris. | |
| | | 35 | | Basic Issue Items | (Interior) Check all items for condition and stowage. | |
| | | 36 | | Dome Lights | Check operation. Replace lamp(s) if defective. Check dimmer control. | |

| B. | .D. | .A. | .M | | | |
|---|---|---|---|---|---|---|
| 47 | | | | Turret Ventilating Fan | Turn on and check for operation. | |
| | | 37 | | Turret Traverse Mechanism | a. Check for loose mounting bolts. | |
| 48 | | | | | b. With vehicle on level ground, release turret traverse lock; manually traverse full circle, and check for free movement. If manual control shaft binds, coat with PL-S lube oil. | Does not operate electrically or manually. |
| 49 | | | | | c. Now, with power, traverse full circle. Check for smooth operation. | |
| | | 38 | | Elevating Mechanism | a. Loose mounting-bolts. | |
| 50 | | | | | b. With both manual and power, elevate and depress gun through entire range and check for smoothness and ease of operation. | Does not operate either electrically or manually. |
| 51 | 5 | | | Control Handle | Adjust for any elevation or traverse drift in normal and stabilization mode. | |

Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| | | | | | **WARNING: Contaminated Filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel.** | |
| 52 | | | | Gas Particulate Filter Unit M8A3 | Inspect for damage and wear. Slide spring clip from over air-intake holes on air purifier. Check spring clip for damage. Replace as necessary. Check operation to determine proper airflow to each protective mask. Solid airflow-caps that are installed must be on tight. Check air hoses and electrical cables for tight connections and replace damaged parts. | No airflow coming from any one of the crew station masks when connected to hose assembly. |
| | | | | 152MM GUN/ LAUNCHER | **WARNING: Make certain gun/launcher is clear of ammo.** | |
| 53 | | 39 | | J5 Branch Wiring Harness | a. Check for breaks/bare wires. | Breaks/bare wires are present. |
| 54 | | | | | b. Make sure clamps a[illegible]ure and properly placed. | |

| B. | D. | A. | M |  |  |  |
|---|---|---|---|---|---|---|
| 55 | 6 |  |  | Cable Assembly ("U" Cord) | a. Bent, cracked or crushed housing. | There is any indication of damage (check "a" thru "h" listed under "U" cord). |
| 56 | 7 |  |  |  | b. Cuts or tears to outer jacket tubing. |  |
| 57 | 8 |  |  |  | c. Separation or breaks which expose wire conductors. |  |
| 58 | 9 |  |  |  | d. Broken copper tubing. |  |
| 59 | 10 |  |  |  | e. Cracks, breaks, and voids which expose wire conductors. |  |
| 60 | 11 |  |  |  | f. Cracked or broken pieces or stripped threads (all connectors). |  |
| 61 | 12 |  |  |  | g. Cracked or broken connector face. |  |
| 62 | 13 |  |  |  | h. Cuts, crushed or damaged molding portions of all connectors. |  |
| 63 |  |  |  | Breech Mechanism Assembly | a. Open and close the breech both manually and electrically. Check for smoothness of operation; no binding. | Does not operate manually or electrically. |
| 64 |  |  |  |  | b. Place loading tray ejector lever in down (eject) position. Manually open breech slowly and watch that detent pin stays withdrawn until breech is fully opened and ejector level activates. |  |

Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures<br>Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| 65 | | | | Obturator Seal | Remove seal and inspect for damage. Clean and lubricate. Install seal . . . snap into place. | Seal missing or defective. |
| | 14 | | | | **WARNING: If flame or smoke escape from breech, stop firing and inspect obturator seal.** | |
| 66 | | | | Firing Circuit | Inspect and operate main firing circuit and auxiliary firing circuit (blasting machine) using firing circuit actuator to determine functioning. | All firing systems/methods inoperative. |
| | 15 | 40 | | Firing Mechanism (probe) | Clean firing probe after every fourth round during firing with 28 volt power supply. Clean probe after every 15th round during firing with 120 volt power supply. | |
| | | 41 | | Gun Tube | Make sure tube is fully depressed with breech open, but not rolled over, and muzzle plug installed to keep out dirt and condensation. | |

| B. | .D. | .A. | .M | | |
|---|---|---|---|---|---|
| | | | | Recoil Mechanism | Check the following: |
| 67 | 16 | | | | a. Safe-to-fire indicator for proper operating range. |
| | 17 | | | | b. Leaks. If leakage during firing exceeds 5 drops for 5 minutes, notify organizational maintenance. |
| 68 | | | | | c. Hydraulic fluid level. |
| 68.1 | | | | | d. Damage to filter screen. |
| | | | 3 | | **NOTE: During periods of inactivity, maintain exercise recoil mechanism every 30 days.** |
| | | | | 7.62MM MACHINE GUN | **WARNING: Make certain machine gun is clear of ammo and barrel is free of obstructions.** |
| 69 | | | | | a. Check connector at solenoid; it should be on securely. |
| 70 | | | | | b. "Fire" machine gun from three triggers at gunner's control handle at elevation handwheel, and at commander's control handle during each fire, listen for a click at solenoid. |
| 71 | | | | | c. Hand function weapon. |

### Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| | | | | LASER RANGE FINDER | | |
| | | | | General Appearance | Check the following: | |
| 72 | | | | | a. Accumulation of dirt, oil, grease or other foreign matter. Clean if necessary. | |
| 73 | | | | | b. Exterior for breaks, cracks, distortions, or other evidence of damage. Notify organizational maintenance for necessary repairs. | |
| | | 42 | | | c. Missing parts. Notify organizational maintenance for necessary repairs. | |
| 74 | | | | Transceiver | a. Open door and clean window. | |
| 75 | | | | | b. Perform visual optics checks of LRF. | |
| 76 | | | | | c. Perform LRF built-in test procedures. | |

|  | B. | .D. | .A. | .M |  |  |  |
|---|---|---|---|---|---|---|---|
|  |  |  |  |  | SIGHTING AND FIRE CONTROL |  |  |
| 77 |  |  |  |  | Quadrant M13A1C | Check general condition and completeness. |  |
|  |  |  |  |  | Azimuth Indicator | Check the following: |  |
| 78 |  |  |  |  |  | a. General condition and completeness. |  |
| 79 |  |  |  |  |  | b. Loose electrical connections, defective or damaged wires. Replace lamp(s), if defective. |  |
|  |  |  |  |  | Telescope M127 or M127A1 | Check the following: |  |
| 80 |  |  |  |  |  | a. General condition and completeness. | Missile Reticle will not illuminate, total obstruction of target image, cannot be boresighted with main gun, or image will not focus. |
| 81 |  |  |  |  |  | b. Operation of all adjustment knobs, slip scales, and filter selector lever. |  |
| 82 |  |  |  |  |  | c. Scales are legible; clean if needed. |  |
| 83 |  |  |  |  |  | d. Lens and windows are free of dirt, condensation, chips, cracks, and fungus. |  |
| 84 |  |  |  |  |  | e. Electrical connections for tightness. |  |

### Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| 85 | | | | Telescope M127 or M127A1 (con't) | f. With selector lever at 8 power, then at 12 power, lever should operate smoothly and seat firmly against stops. | |
| | | | | Telescope Mount M149 | Check the following: | |
| 86 | | | | | a. General condition and completeness. | |
| 87 | | | | | b. Locking lever should be in up (detent) position. | |
| 88 | | | | | c. Inspect window for dirt, condensation, chips, cracks, and fungus. | |
| | | | | Periscope XM44 Series and Control Panel | Check the following: | |
| 89 | | | | | a. General condition and completeness. | XM 44 Periscope inoperative. M127 and M127A1 Conventional reticle inoperative. |
| 90 | | | | | b. Operation of knobs and levers. | |
| 91 | | | | | c. Lens and windows should be free of dirt, condensation, cracks, chips and fungus. | |
| 92 | | | | | d. Electrical connections for tightness. Replace lamp(s) if defective. | |

| B. | .D. | .A. | .M |  |  |  |
|---|---|---|---|---|---|---|
|  |  |  |  | MISSILE SUBSYSTEM UNITS |  |  |
| 93 |  |  |  | Cable Assemblies | Check condition and tightness of all connectors. |  |
|  |  |  |  | Tracker, Modulator, Rate Sensing Unit, Signal Data Converter, Transmitter, Test Set and Power Supply | Check the following: |  |
| 94 |  |  |  |  | a. Clean exterior surface of dirt, rust, and foreign matter. | Subsystem fails to pass any step of the system self test. Refer to page 2-98. |
|  |  | 43 |  |  | b. Check units for loose mounting bolts. |  |
| 95 |  |  |  |  | c. Open and close transmitter door; check for smooth operation. |  |
|  |  | 44 |  |  | d. Lubricate door seal. |  |
|  |  |  |  | CLOSED-BREECH SCAVENGING SYSTEM (CBSS) |  |  |
|  |  |  |  | Compressor. | Check the following: |  |
| 96 |  |  |  |  | a. Oil level with dipstick screwed in. If low, clean area around filler hole and add oil to full mark (some models have sight glass). |  |
|  | 18 | 45 |  |  | b. Oil leaks. | Oil leaks present. |
| 97 |  |  |  |  | c. Finned tubes and fan screen; clean as required. |  |

Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| 98 | | | | Compressor (con't) | d. Cooling tubes for distortion, cracks, dents, and loose connections and air leaks. Inspect fan for dents, bent blades, looseness, or other defects. | Air Leaks. |
| 99 | | | | | e. If pressure gauge reads below 2700 psi, start vehicle engine and idle at 1200 rpm. Turn on compressor until gage reads 3100 psi (1-1/2 to 2 hours). Operate once a week for a period of at least 30 minutes. | Gauge inoperative. |
| 100 | | | | | f. With compressor on, monitor for unusual noises, vibrations, smoke, or overheating. If cause of abnormal operation cannot be located and corrected shut down compressor.<br>**NOTE: Do not use water to clean in area of compressor.** | Compressor is inoperative or will not develop 750 psi. |
| | | 46 | | | g. CBSS hose for blisters under outer cover. Bleed air from blister larger than size of dime. | |

| | B. | .D. | .A. | .M | | | |
|---|---|---|---|---|---|---|---|
| 101 | | | | | Compressor (con't) | h. Operation of moisture dump-valve. Valve should open every 30 minutes of compressor operation or when compressor stops. | |
| | | | | 4 | | i. Bleed air bottles monthly. Recharge to 1200 psi minimum. | |
| 102 | | | | | Compressor* | j. Check straps on air bottles and safety wires on air hoses. | |
| 103 | | | | | | k. Check manual discharge lever. | |
| 104 | | | | | | l. Check pressure-regulator valve to determine if air can be clearly heard flowing into gun/launcher. | No sound of air flowing into gun/launcher. |
| 105 | | | | | | m. Check for leaks where tube slides in and out of telescoping tube assembly and striker housing. | Tube broken or missing. |
| 106 | | | 47 | | Compressed Air Bottles. | Check both bottles and manual shut-off valve for damage. | One or both bottles with lengthwise cracks in fiberglass wrapping. Or, one or both bottles with bulges, leaks, or heavy damage. Or, manual shutoff valve will not work or is broken. |

*See NOTE Page 3-15.

## Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures<br>Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| | | | | COMMUNICATIONS EQUIPMENT | | |
| 107 | | | | General | a. Inspect the exterior of the equipment. The exterior surfaces should be clean and free of dust, dirt, grease and fungus. | |
| 108 | | | | | b. Check plugs and connectors for dirt, dust and tightness. | |
| | | | | ANTENNA SYSTEM | Check the following: | |
| 109 | | | | | a. Antenna-tip cap is in place on the top antenna section. | |
| | | 48 | | | b. Antenna sections are not split or shattered. | |
| | | | | CVC HELMETS | Check the following: | |
| | | 49 | | | a. Moisture barrier is in place in the microphone and the earphone, if applicable. | |

| B. | D. | A. | M | | |
|---|---|---|---|---|---|
| | | 50 | | | b. Microphone boom-assembly functions properly. |
| | | 51 | | | c. Switch action is positive, cables are connected to the connectors, and the cable insulation is not damaged. |
| | | 52 | | | d. Both earphones have required cushions. |
| | | 53 | | | e. O-rings in cable connectors are tightly in place. |
| | | | | RADIO SET | |
| | | | | Receiver - Transmitter | Check the following: |
| | | 54 | | | a. The wing nuts holding the receiver-transmitter are tight. |
| | | 55 | | | b. The POWER, BAND, frequency and squelch switches do not bind and that they operate properly through the detent position. |
| | | 56 | | | c. The volume knob operates smoothly and does not bind. |
| 110 | | | | | d. That all remote power controls operate properly. |
| | | 57 | | Receiver | The wing nuts holding the receiver are tight. |

Table 3-1. Preventive Maintenance Checks and Services - continued

Note: Within designated interval, perform these checks in the order listed.
B - Before D - During A - After M - Monthly

| Item Number and Interval | | | | Item to be inspected | Procedures Check for and have repaired | For readiness reporting, equipment is not ready/ not available if: |
|---|---|---|---|---|---|---|
| B | D | A | M | | | |
| | | | | Crew Members Control Boxes, Intercom Operation | Check the following: | |
| 111 | | | | | a. All cable connections are tight at each control box. | |
| 112 | | | | | b. MONITOR switch operates to each switch position. | |
| 113 | | | | | c. Audio accessories are connected to the control boxes. | |
| 114 | | | | | d. VOLUME control knob is in place, not damaged, and operates smoothly over its entire range. | |
| 115 | | | | | e. Communication between each member of the crew is clear. | No communication from commander to driver. |
| | | | | Crew Member's Control Boxes, Radio Operation | Check the following: | |
| 116 | | | | | Check that clear two-way communication is possible with a distant radio from commander's control box. | Unable to communicate. |

| B. | .D. | .A. | .M |  |  |  |
|---|---|---|---|---|---|---|
|  |  | 58 |  | External Crew Member Control Box C-2296/ VRC | Check the following:<br>a. Handset is not defective, cables are not cut, and cover to protective box can be closed tightly. |  |
|  |  | 59 |  |  | b. Light functions on the external control box when driver signals from his control box. |  |
|  |  | 60 |  |  | c. During intercom operation SIG light functions at driver control box when handset switch is depressed and goes off when it is released. |  |
|  |  | 61 |  |  | d. Two way intercom communication is clear between external control box, and each crew member's control box. |  |

# Section III. TROUBLESHOOTING

**3-6. Scope.**

a. This section contains troubleshooting information for locating and correcting many of the operating troubles which may develop in the AR/AAV. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which help you determine probable causes and corrective actions to take. Perform the tests/inspections and corrective actions in the order listed in table 3-2.

b. This manual cannot list all possible malfunctions that may occur, or all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify organizational maintenance.

Table 3-2. Troubleshooting

MALFUNCTION
  TEST OR INSPECTION
    CORRECTIVE ACTION

---

ENGINE

1. ENGINE FAILS TO CRANK, OR CRANKS SLOWLY, WHEN STARTER SWITCH IS OPERATED.

   Step 1. MASTER SWITCH not on.
   Turn MASTER SWITCH on.

   Step 2. Transmission shift is not in N (neutral) position.
   Move to N position.

   Step 3. Electrolyte level in battery cells is low.
   If below split rings, add distilled or clean water until electrolyte is at bottom of O-ring. Recharge batteries.

   Step 4. Loose, corroded, or broken cables.
   Clean and tighten loose connections at battery, ground, and starter. If cables are broken, notify organizational maintenance.

Table 3-2. Troubleshooting - continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE - continued

Step 2. Fuel shutoff control knob is pulled out.
Push in knob.

Step 3. Main fuel hose is disconnected.
Connect.

Step 4. Fuel tank valves are closed.
Open.

Step 5. Fixed fire-extinguisher knob is pulled out and not reset.
Reset knob. Report to organizational maintenance at once for service.

3. ENGINE STARTS BUT SPEED IS ERRATIC.

**WARNING: Contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel.**

Step 1. Insufficient fuel.
Inspect fuel lines and filters for breaks or louse connections.

Step 2. Water in fuel.
Drain condensation from fuel filters and center fuel tank condensation drain pump.

4. ACCELERATING IMPROPERLY.

Step 1. Debris and foreign objects in accelerator linkage in driver's compartment.
Clean.

**WARNING: Contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel.**

Step 2. Insufficient fuel.
Check lines and filters for leaks.

Step 3. Insufficient air.
Check air cleaner restriction indicator.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

5. ENGINE OVERHEATS.

Step 1. If low oil pressure warning light is ON or FLASHING, STOP the engine IMMEDIATELY.

Step 2. Examine FRONT of radiator core for clogged exterior, and air inlet grille for **debris** clogging the air passage.

**If badly clogged, have organizational maintenance clean it AT ONCE.**

Step 3. After engine has cooled down, check crankcase oil and coolant levels.

Step 4. Check coolant-pump drive-belt tension for no more than 1/4-inch belt deflection. Check generator and fan drive belts for "drum skin" tightness.

Step 5. Check coolant pressure cap for serviceability.

Step 6. Check surge tank for leaks.

6. LOW OR NO OIL PRESSURE.

Step 1. Inadequate oil level.

Fill to proper level, if necessary.

Step 2. Oil leaks at oil sump drain plug, oil filter and filter plug, or in engine compartment.

Tighten connections and replenish oil, if necessary.

Step 3. Check for loose electrical connections at transmitter and light.

## TRANSMISSION

7. TRANSMISSION DOES NOT FUNCTION IN ANY RANGE (VEHICLE DOES NOT MOVE).

Low transmission oil pressure.

Check oil level. Fill to proper lever, if necessary.

Table 3-2. Troubleshooting - continued.

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

### BATTERIES/GENERATING SYSTEM

8. NO CURRENT IN BATTERY CIRCUIT.
   Corroded or loose cable connections.
      Clean and tighten cables and connections at batteries and check master relay connection.

9. BATTERIES DO NOT STAY CHARGED.
   Check battery/generator indicator.
      If not in GREEN with engine running, notify organizational maintenance.

10. MASTER SWITCH INDICATOR LAMP DOES NOT LIGHT.
    Step 1. MASTER SWITCH is off.
       Turn MASTER SWITCH on.

    Step 2. Burned out lamp.
       Replace.

    Step 3. Loose electrical leads.
       Insure fully seated.

### TRACKS AND SUSPENSION

11. VEHICLE PULLS TO SIDE WITH STEER BAR IN CENTER POSITION.
    Step 1. Mud or dirt buildup on tracks.
       Clean.
    Step 2. Check track tension.
       Adjust if required.

12. VEHICLE THROWS TRACK.
    Step 1. Excessively loose or worn track.
       Adjust or replace.

    Step 2. Improper vehicle operation.
       Caution operator personnel.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

---

### PERSONNEL HEATER

13. HEATER FAILS TO START.
    Review operating procedures.

14. HEAT EXCHANGER LOADS UP WITH SOOT.
    Step 1. Fuel oil too heavy grade for ambient temperatures.
        Drain and fill with proper fuel oil.

    Step 2. Exhaust is restricted.
        Remove restriction at exhaust outlet.

### BILGE PUMPS

15. BILGE PUMPS DO NOT OPERATE WITH BILGE PUMP SWITCHES ON.
    Step 1. MASTER SWITCH is off.
        Turn MASTER SWITCH on.

    Step 2. Loose electrical connections in operator's compartment.
        Seat Connectors.

    Step 3. Frozen water in bilge pump
        Start engine and personnel heater.

### M47 AND M48 PERISCOPES

16. POOR VISIBILITY.
    Step 1. Dirty optical surfaces.
        Clean surfaces with lens tissue.

    Step 2. Condensation.
        Report to organizational maintenance.

    Step 3. Window washer does not operate.
        Reservoir is empty or fluid level too low.
            Fill reservoir.
        Leak or break in washer hose.
            Inspect hoses, replace any found defective.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

Step 4. Windshield wiper does not function.
Wiper assembly defective.
Replace wiper assembly.

## M48 PERISCOPE

17. FOGGY/NO INFRARED VISION.
Step 1. POWER SWITCH on periscope not on.
Turn on.

Step 2. Operating from battery.
Replace 1-1/2 volt cell.

## CUPOLA ELECTRICAL TRAVERSING SYSTEM

18. CUPOLA TRAVERSES SLUGGISHLY.
Step 1. Ring-gear contaminated with foreign matter.
Remove foreign matter and clean.

Step 2. Electrical contact ring and contact-point assemblies contain dirt and foreign matter.
Remove foreign matter and clean.

19. CUPOLA TRAVERSES IN ONE DIRECTION ONLY . . . WITH OR WITHOUT PUSHING ROTATION SWITCH.
Loose connections at control assembly and traverse mechanism control box. Contact brush assemblies dirty/misaligned.
Tighten connections.
Check for damaged electrical wiring harness to cal .50 MG.

20. CUPOLA WON'T TRAVERSE ELECTRICALLY.

**CAUTION: If a humming noise is heard from motor, turn POWER SWITCH off immediately.**

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

CUPOLA ELECTRICAL TRAVERSING SYSTEM - continued

Step 1. POWER SWITCH at cupola control is off.
Turn POWER SWITCH on.

Step 2. Foreign matter in electrical contact ring.
Remove foreign matter and clean.

Step 3. Loose connections at control assembly and traverse mechanism control box.
Tighten connections.

GUN/LAUNCHER ELEVATING AND TURRET TRAVERSING SYSTEMS

21. HARD TO ELEVATE OR DEPRESS GUN MANUALLY.

Step 1. Binding and obstructions in shield area, gear box, and trunnion bearing.
If any obstructions, remove.

Step 2. Contaminated lubricant in elevating mechanism support bearings.
Lubricate, if needed.

22. CAN'T OPERATE ELEVATING MECHANISM ELECTRICALLY WITH PALM SWITCH DEPRESSED.

Step 1. Vehicle MASTER SWITCH is off.
Turn MASTER SWITCH on.

Step 2. TURRET CONTROL SWITCH is off.
Turn TURRET CONTROL SWITCH on.

Step 3. Loose electrical connectors.
Tighten connectors.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

GUN/LAUNCHER ELEVATING AND TURRET TRAVERSING SYSTEMS - continued

23. AN EXCESSIVE DEAD SPACE IN EITHER CONTROL HANDLE WHEN ELEVATING OR DEPRESSING.
    Step 1. Binding and obstructions in shield area.
        Remove obstructions, if any.

    Step 2. Contaminated lubricant in elevating mechanism support bearings.
        Lubricate if needed.

24. TURRET WILL NOT TRAVERSE IN EITHER DIRECTION. ELECTRICALLY OR MANUALLY.
    Step 1. Obstructions.
        Clear obstructions.

    Step 2. Turret traverse locked.
        Unlock.

25. GUN CREEPS UP OR DOWN AND/OR TURRET CREEPS RIGHT OR LEFT WITH PALM SWITCH PRESSED AND CONTROL HANDLE IN NEUTRAL POSITION.
    ELEV and/or TRAV trim buttons out of adjustment.
        Adjust buttons, if required.

26. MOTOR-GENERATOR POWERED WITHOUT PRESSING PALM SWITCH.
    Dirt in PALM SWITCH.
        Notify support maintenance to clean palm switch.

27. OVERHEATING OF TRAVERSE AND/OR ELEVATION SERVO-MOTOR(S) DURING OPERATION.
    Step 1. Check manual operation.
        Notify support maintenance.

    Step 2. Obstructions in turret ring gear/basket.
        Remove obstructions.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

## GUN/LAUNCHER ELEVATING AND TURRET TRAVERSING SYSTEMS - continued

28. MOTOR GENERATOR DOES NOT OPERATE WITH PALM SWITCHES PRESSED.

Step 1. Vehicle MASTER SWITCH is off.
Turn MASTER SWITCH on.

Step 2. TURRET CONTROL SWITCH is off.
Turn TURRET CONTROL SWITCH on.

Step 3. Loose electrical connectors on motor generator.
Tighten connections.

## 152-MM GUN/LAUNCHER

29. REPLENISHER HAND-PUMP DOESN'T INCREASE PRESSURE OF RECOIL MECHANISM.

Incorrect fluid level in reservoir.
Fill to proper level.

30. GUN/LAUNCHER RETURNS TO BATTERY WITH EXCESSIVE FORCE.

Incorrect fluid level in counterrecoil buffer.
Pump up by using replenisher handpump.

31. CAN'T FIRE CONVENTIONAL AMMO OR MISSILE - BOTH READY LAMPS ARE ON.

Step 1. Defective ammo/missile.
Perform misfire procedure.

**WARNING: Check firing mechanism with ammo removed.**

Step 2. Dirty firing probe of firing mechanism.
Clean firing probe with nylon scouring pad ... perform firing circuit check with firing probe tester (page 3-112).

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

152-MM GUN/LAUNCHER - continued

32. LOADER'S AND/OR GUNNER'S READY LAMP(S) DO(ES) NOT LIGHT.

Step 1. Lamps, when pressed, do not light.
Check lamp dimmer control. Replace lamp(s).

Step 2. Safe-to-fire indicator rod is not in operating range.
Adjust pressure.

Step 3. Gun is out of battery.
Check safe-to-fire indicator rod and, if necessary, increase pressure and return gun to battery.
Check for air in recoil mechanism (use bleed valve).

33. CAN'T FULLY CLOSE BREECH CHAMBER.

**NOTE: Open breech manually for inspection.**

Obstructions and foreign matter between buttress threads, and between chamber and tube facing.

Step 1. Remove obstructions and foreign matter.

Step 2. Clean inside of breech.

Step 3. Check obturator seal for proper seating.

7.62-MM MACHINE GUN

34. CAN'T FEED AMMO.

Step 1. Faulty links and ammo.
Remove and replace.

Step 2. Defective driving studs.
Replace barrel extension assembly.

Step 3. Cover is open and unlocked.
Close cover and lock.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

---

7.62-MM MACHINE GUN - continued

Step 4. Improper loading of ammo in loading box.
    Reload ammo.

35. CAN'T FEED AMMO AFTER ROUND IS IN FEED TRAY AND COVER CLOSED.
    Barrel extension in forward position.
        Repeat loading procedure.

36. CAN'T CHAMBER AMMO.
    Step 1. Damaged ammo.
        Remove and replace.

    Step 2. Improper installation of ammo belt.
        Install with open sides of links facing downward.

    Step 3. Defective driving spring.
        Replace.

    Step 4. Defective cartridge rammer.
        Replace barrel extension assembly.

    Step 5. Obstructions in chamber.
        Remove obstructions.

    Step 6. Defective rammer actuator roller.
        Replace barrel extension assembly.

37. CAN'T LOCK.
    Step 1. Defective breechblock roller.
        Replace breechblock assembly.

    Step 2. Defective breech closing lever actuator roller.
        Replace barrel extension assembly.

    Step 3. Defective driving spring.
        Replace springs.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

7.62-MM MACHINE GUN - continued

38. CAN'T FIRE.

Step 1. Defective barrel extension assembly.
Replace.

Step 2. Defective firing pin.
Replace breechblock assembly.

Step 3. Defective firing pin extension.
Replace barrel extension assembly.

Step 4. Defective ammo.
Remove defective round and reload.

39. CAN'T UNLOCK.

Defective breech opening lever actuator roller.
Replace barrel extension assembly.

40. CAN'T EXTRACT AMMO.

Step 1. Ruptured cartridge case in barrel.
Replace with spare barrel, when situation permits, and remove ruptured case.

Step 2. Defective extractor.
Replace barrel extension assembly.

Step 3. Defective cartridge rammer.
Replace barrel extension assembly.

Step 4. Defective extractor spring.
Replace barrel extension assembly.

Step 5. Pitted chamber in barrel.
Replace barrel assembly.

Step 6. Short recoil and/or binding parts.
Clean and lubricate.
Check barrel bearing/booster for looseness.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
    TEST OR INSPECTION
        CORRECTIVE ACTION

---

7.62-MM MACHINE GUN - continued

41. CAN'T EJECT FIRED CASE.
    Ruptured cartridge case.
        Remove, using ruptured cartridge extractor.

42. CAN'T COCK GUN.
    Defective barrel extension assembly.
        Replace.

43. CAN'T CONTROL FIRING.
    Defective barrel extension assembly.
        Replace.

44. CAN'T CONTROL RATE-OF-FIRE.
    Rate control pawl is missing.
        Replace barrel extension assembly.

CALIBER .50 MACHINE GUN

45. CAN'T FEED AMMO.
    Step 1. Defective ammo belt.
        Remove damaged link(s)/round(s).

    Step 2. Defective ammo; for example, long round.
        Remove.

    Step 3. Incorrect timing.
        Adjust.

46. CAN'T CHAMBER AMMO.
    Step 1. Obstructions in barrel assembly, chamber, and receiver group.
        Clean and lubricate.

    Step 2. Damaged round.
        Remove damaged round and repeat loading procedures.
        Return damaged round to ASP.

47. CAN'T LOCK.
    Overtight headspace.
        Adjust headspace.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

CALIBER .50 MACHINE GUN - continued

48. CAN'T FIRE.

Step 1. Incorrect timing.
Adjust.

Step 2. Damaged round.
Remove.

Step 3. Incorrectly installed sear slide.
Correctly install.

Step 4. Obstructions in firing-pin well.
Clean and lubricate.

49. CAN'T UNLOCK.

Step 1. Defective round . . . noticeable by a short recoil.
Remove empty cartridge.

Step 2. Burrs and binding in receiver and bolt.
Remove any burrs; clean and lubricate.

50. CAN'T EXTRACT AMMO.

Step 1. Ruptured cartridge case.
Remove cartridge case.

Step 2. Loose headspace. Check for independent movement between bolt and barrel, and barrel extension.
Adjust headspace.

Step 3. Pitted barrel chamber.
Replace barrel assembly.

51. CAN'T EJECT.

Defective ammo . . . noticeable by a short recoil.
Clear and reload machine gun.

52. CAN'T LOCK.

Incorrect timing.
Adjust.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

PERISCOPE XM44 SERIES

53. NO RETICLE PATTERN . . . WITH RETICLE LIGHT ON.
Incorrect filter lever position.
Adjust accordingly.

54. POOR OR NO RETICLE LIGHT.
Step 1. Defective reticle lamp.
Replace.

Step 2. Loose cable connections at control panel.
Tighten connections.

55. VISION IS POOR DURING DAYLIGHT OPERATION.
Condensation.
Wipe lens dry.

56. CONTROL PANEL LAMP(S) DON'T LIGHT.
Check lamp(s).
Replace defective lamp(s).

57. TOO MUCH LIGHT.
Incorrect filter lever position.
Move to darker position for better lighting.

58. WINDSHIELD WASHER OR WIPER DOES NOT OPERATE PROPERLY.
Step 1. Clogged washer nozzle, dirty strainer screen, low fluid in reservoir.
Clean or fill, as applicable.

Step 2. Wiper knob (on panel assembly) set at off.
Turn knob clockwise to increase wiper speed.

TELESCOPE M127 OR M127A1

59. POOR OR NO RETICLE LIGHT.
TURRET CONTROL SWITCH is off.
Turn TURRET CONTROL SWITCH on.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

AZIMUTH INDICATOR

60. INDICATOR DIAL DOESN'T LIGHT.
Step 1. Loose electrical connections.
Tighten connections.

Step 2. Defective lamps.
Replace lamps.

MISSILE GUIDANCE AND CONTROL SYSTEM

61. A. (LAMP AND METER TEST) LAMPS DO NOT LIGHT, AND METER DOES NOT DEFLECT ON TEST CHECKOUT PANEL.
Step 1. No power to test checkout panel.
Check cable connections.
Repeat test.

Step 2. Test checkout panel defective.
Request maintenance.

B. (LAMP AND METER TEST) ENI INDICATION NOT PROPER (CENTER GREEN LED DOES NOT ILLUMINATE OR LED OTHER THAN CENTER GREEN ILLUMINATES) BUT LAMPS LIGHT.
Step 1. Cable not properly connected.
Check cable connections.
Repeat test.

Step 2. Test checkout panel defective.
Request maintenance.

C. (LAMP AND METER TEST) ENI INDICATION IS PROPER (ONLY ENI CENTER GREEN LED ILLUMINATES), BUT ONE OR MORE LAMPS DO NOT LIGHT.
Step 1. Cable not properly connected.
Check cable connections.
Repeat test.

Step 2. Defective lamps.
Replace defective lamps.
Repeat test.

Step 3. Test checkout panel defective.
Request maintenance.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

MISSILE GUIDANCE AND CONTROL SYSTEM - continued

62. (CHECKSIGHT LAMP ALIGNMENT TEST) CANNOT SEE SPOT OF LIGHT THROUGH TELESCOPE.

Step 1. Telescope filter not in clear position.
Place telescope filter in clear position.
Repeat test.

Step 2. Align and/or error lever on telescope mount M149 not in position.
Move align lever to full right (UP) and error lever to full left position (DOWN).
Repeat test.

Step 3. EL or AZ adjustment out of alignment.
Place EL and AZ adjustment screws (on telescope mount) at midrange.
This is done by turning the EL screw until it stops (DO NOT FORCE).
Then count the number of turns in the opposite direction until the screw stops. Turn the screw back half of this count and this should be approximately midrange.
Do the same for the AZ screw.
Repeat test.

Step 4. Checksight source lamp defective.
Replace checksight source lamp.
Repeat test.

63. (TRACKER ALIGNMENT TEST) ELECTRONIC NULL METER WILL NOT ADJUST TO CENTER GREEN LED USING AZ OR EL ADJUSTMENT SCREWS, LOCATED ON TELESCOPE MOUNT.

Step 1. Error lever not in the left (DOWN) position.
Move error lever to the left (DOWN) position.
Repeat test.

Step 2. Align lever not in the up (RIGHT) position.
Move align lever to the up (RIGHT) position.
Repeat test.

Table 3-2. Troubleshooting - continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

MISSILE GUIDANCE AND CONTROL SYSTEM - continued

Step 3. Checksight source lamp defective.
Look into the telescope. Verify that checksight source spot-of-light is visible. If not, refer to paragraph 62, steps 1 - 4 for procedures (page 3-50).
Repeat test.

64. (SYSTEM SELF-TEST) TRACKER LAMP GLOWS AT COMPLETION OF TEST.

Step 1. Align lever not in right (UP) position.
Place align lever in right (UP) position.
Repeat test.

Step 2. Tracker not properly aligned.
Perform tracker alignment. Refer to paragraph 2-48 (f) (page 2-104).
Repeat test.

65. (SYSTEM SELF-TEST) SIGNAL DATA CONVERTER GLOWS AT COMPLETION OF TEST.

Step 1. Error lever not in right (UP) position.
Place error lever in right (UP) position
Repeat test.

Step 2. Tracker not properly aligned.
Perform tracker alignment. Refer to paragraph 2-48(f) (page 2-104).
Repeat test.

INFRARED SEARCHLIGHT AN/VSS-3 OR AN/VSS-3A

**WARNING: Make certain all personnel are out of path of searchlight beam.**

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

INFRARED SEARCHLIGHT AN/VSS-3/AN/VSS-3A - continued

**CAUTION: Do not operate searchlight with vehicle engine off.**

66. LAMP DOES NOT LIGHT, BLOWER MOTOR DOES NOT OPERATE, AND LAMP ON INDICATOR DOES NOT LIGHT.

Step 1. Loose connections.
Tighten connections.

Step 2. Defective cables.
Repair.

Step 3. CIRCUIT TEST SWITCH at position 2 and CIRCUIT TEST indicator lamp does not light.
If indicator does not light, increase vehicle engine 1000-1300 RPM.

67. LAMP IGNITES AND LAMP ON INDICATOR LIGHTS . . . BUT BLOWER DOES NOT RUN.

Obstructions in air intake and exhaust ducts.
Remove obstructions and clean ducts.

68. THE LAMP FLASHES BUT DOESN'T IGNITE.

Inspect intercabling connectors at control box.
Tighten connectors.

COMMUNICATIONS EQUIPMENT

69. UNABLE TO COMMUNICATE ON EITHER INTERCOM OR RADIO (ALL/SOME CREW MEMBERS HAVE THIS PROBLEM).

Step 1. Defective helmet.
Connect a good helmet to control box. If communication can be established, replace faulty helmet.

Step 2. Other crew members not experiencing defective helmets.
Tighten cable connectors on top of amplifier AM-1780/VRC and at vehicle connector.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

COMMUNICATIONS EQUIPMENT - continued

Step 3. Other crew members experiencing defective helmets and MASTER SWITCH is off.
Turn MASTER SWITCH on.

Step 4. Radio is not pushed back fully on its mount and mounting clamps are not tightened fully.
Secure radio in mount, tighten clamps.

Step 5. MX-7778/GRC ON-OFF SWITCH is not set to ON.
Turn MX-7778/GRC SWITCH to ON.

**NOTE: Next two steps for driver only.**

Step 6. Control Box is not operating.
Set SIG SWITCH to EXT position. Lamp should light.

Step 7. Loose connectors . . . EXT lamp does not light.

a. Tighten connectors at sides of control box and at vehicle connectors.

b. In turret, tighten cable connectors on top of amplifier AM-1780/VRC and at vehicle connector.

Step 8. Cable connections to the MX-7778/GRC and the radio mount are not fully tightened.
Tighten cables.

Step 9. If the RT-246(*)/VRC is in the REMOTE position, C-2742/VRC PWR SWITCH is set to HI.
Turn POWER switch on C-2742/VRC to LO.

Step 10. POWER SWITCH on the radio is not turned on.
Turn PWR switch on radio ON.

Step 11. AM-1780/VRC MAIN PWR SWITCH is not set to NORM.
Set MAIN PWR SWITCH to NORM.

Table 3-2. Troubleshooting - continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

COMMUNICATIONS EQUIPMENT - continued

Step 12. AM-1780/VRC INSTALLATION SWITCH is not set to OTHER.
Set the INSTALLATION SWITCH to OTHER.

70. UNABLE TO TRANSMIT OR RECEIVE OVER RADIO SET.

Step 1. Substituted operable helmet works.
Replace if communication is possible.

Step 2. VOLUME control knob on the control box is not turned to an audible level.
Adjust VOLUME control to a comfortable listening level.

Step 3a. Incorrect assigned frequency is set up on the radio.
Place correct frequency on radio.

Step 3b. With C-2742/VRC being used with the RT-246/VRC, incorrect assigned frequency is displayed in the RT-246(*)/VRC dial window.
Rotate selector switch on C-2742/VRC to correct frequency.

Step 4. Whip antenna is damaged or not intact.
Replace antenna.

Step 5. Antenna is touching a metal structure such as a bridge or the vehicle under a bridge.
Move the vehicle.

Step 6. One of the crew member's CVC helmets is locked back in its ICS intercom position.
Place switch in MONITOR position.

Step 7. Loose whip antenna sections.
Tighten antenna section.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

COMMUNICATIONS EQUIPMENT - continued

Step 8. Antenna cable is not connected to radio, and antenna and cable connections are loose.
Connect/tighten cable connection.

Step 9. Squelch operation is not being used.
Set the SQUELCH switch to OFF (or the FUNCTION switch on AN/VRC-64 to on).

71. UNABLE TO ESTABLISH RADIO CONTACT WITH DISTANT RADIO STATION (RADIO SIDETONE CAN BE HEARD. OTHER CREW MEMBERS DO NOT HAVE THIS PROBLEM).

Step 1. Communication possible with substituted helmet.
Replace helmet, if communication has been established.

Step 2. Ask turret crew member to check operation of radio by connecting his CVC helmet to the radio. If this works, fault is in intercom system.

72. UNABLE TO COMMUNICATE ON INTERCOM (SIDETONE IS HEARD BUT OTHER CREW MEMBERS DO NOT HAVE THIS PROBLEM).

Step 1. Communication possible with substituted helmet.
Replace, if communication on intercom has been established.

Step 2. Loose cable connections.

a. Tighten connectors at sides of control box and at vehicle connectors.

b. In turret, tighten cable connection on top of amplifier AM-1780/VRC and at vehicle connector.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

COMMUNICATIONS EQUIPMENT - continued

73. UNABLE TO HEAR OUTPUT OF RADIO RECEIVER (MONITOR SWITCH POSITION B, OTHER CREW MEMBERS DO NOT HAVE PROBLEM).

Step 1. Communication possible with substituted helmet.

Replace, if intercom communication has been established.

Step 2. Loose control cable connections.

a. Tighten control cable connectors at the sides of the control box and at the outlets in the vehicle.

b. In turret, tighten control cable connectors on top of amplifier AM-1780/VRC and at vehicle connector.

74. UNABLE TO COMMUNICATE ON INTERCOM OR RADIO FROM OUTSIDE OF VEHICLE.

Step 1. MONITOR switch at driver's control box C-2298/VRC is not set at A or ALL for radio function, or at INT ONLY for intercom communication.

Set SIG switch to EXT; EXT indicator lamp must be lit.

Step 2. Loose connectors at control box.

Tighten.

Step 3. Loose control cable on exterior control box.

Tighten.

75. UNABLE TO ATTRACT DRIVER'S ATTENTION BY OPERATING HANDSET SWITCH BUT INTERCOM COMMUNICATION IS POSSIBLE FROM OUTSIDE VEHICLE.

Step 1. Defective EXT indicator lamp on driver's C-2297/VRC.

Replace lamp.

Step 2. Substituted EXT indicator lamp does not light. After replacing lamp, and it still does not light, notify organizational maintenance.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

COMMUNICATIONS EQUIPMENT - continued

76. LAMP OUTSIDE VEHICLE DOES NOT LIGHT WHEN SIGNALED FROM DRIVER'S CONTROL BOX BUT INTERCOM COMMUNICATION IS POSSIBLE.

Step 1. Defective lamp.
Replace lamp.

Step 2. Loose cable to lamp connection.
Tighten or connect to lamp receptacle.

CREW SERVED WEAPONS NIGHT VISION SIGHT

77. RETICLE WILL NOT ILLUMINATE.

Step 1. Weak or defective battery.
Replace.

Step 2. Defective reticle lamp.
Replace lamp.

Step 3. Faulty wiring.
Report condition to organizational maintenance.

78. IMAGE INTENSIFIER TUBE IS WEAK OR WILL NOT ILLUMINATE.

Step 1. Weak or defective battery.
Replace battery.

Step 2. Weak or defective tube.
Report condition to organizational maintenance.

79. IMAGE IS BLURRED.

Step 1. Objective lens or eyepiece dirty or fogged.
Clean lens.

Step 2. Objective lens out of focus.
Adjust lens focus knob.

Step 3. Eyepiece out of focus.
Adjust focus ring.

Step 4. Weak battery.
Replace battery.

Table 3-2. Troubleshooting - continued

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

### CREW SERVED WEAPONS NIGHT VISION SIGHT - continued

80. CANT-LEVEL VIAL OR SIGHT WILL NOT ILLUMINATE.

Step 1. Weak or defective battery.
Replace Battery.

Step 2. Defective lamp.
Replace lamp.

Step 3. Faulty wiring.
Report condition to organizational maintenance.

### COMPRESSOR FOR CBSS

81. COMPRESSOR FAILS TO START WHEN COMPRESSOR SWITCH IS ON AND AIR-PRESSURE GAGE READS BELOW 2800 PSI.

Step 1. Fire control selector is at MISSILE.
Turn selector switch to something other than MISSILE.

Step 2. Power cable to compressor disconnected.
Connect cable.

### GAS-PARTICULATE FILTER UNIT

82. INSUFFICIENT FLOW ALL STATIONS.

Step 1. Spring clip attached.
Pull spring clip away.

Step 2. Air hoses kinked or pinched. Loose connections.
Straighten or replace hoses. Tighten loose connections.

Step 3. Low electrical power.
See alternator malfunction. Notify organizational maintenance personnel if above does not work.

**WARNING: Contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel.**

Step 4. Filter clogged or contaminated.
Notify organizational maintenance personnel.

Table 3-2. Troubleshooting - continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

GAS-PARTICULATE FILTER UNIT - continued

83. AIR FLOW TOO HIGH ALL STATIONS.

Step 1. Air purifier out of adjustment.

Notify organizational maintenance personnel.

84. GAS-PARTICULATE FILTER UNIT WILL NOT OPERATE WHEN AIR COLLECTIVE PROTECTOR CONTROL SWITCH IS IN ON POSITION.

Step 1. Ground wire loose or missing

Notify organizational maintenance personnel.

Step 2. Electrical cable assemblies loose or missing.

Notify organizational maintenance personnel.

Step 3. Switch or circuit breaker defective.

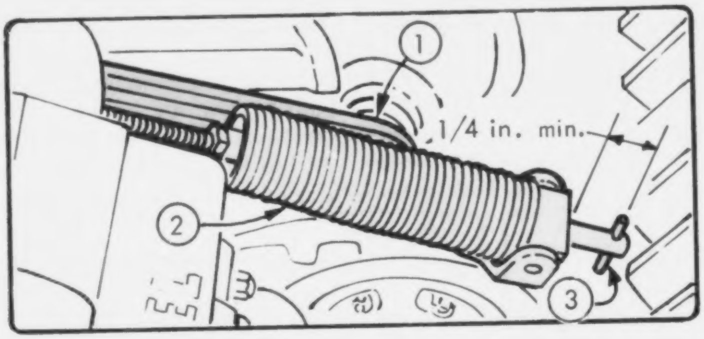
Notify organizational maintenance personnel.

## Section IV. MAINTENANCE PROCEDURES

**3-7. Purpose and Scope.**

This section provides hull and turret maintenance instructions to be performed by the crew.

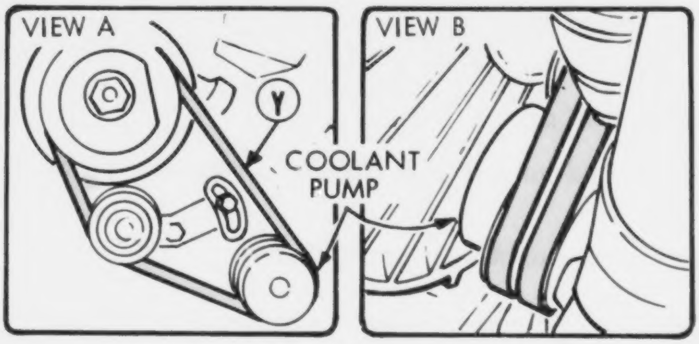
**3-8. Inspecting Generator and Coolant Pump Belts.**



a. Inspect the four generator V-belts (1) for breaks and cracks. Check the belt tensioner (2). If pin (3) is within approximately 1/4-inch of "bottoming out," have organizational maintenance replace belts.

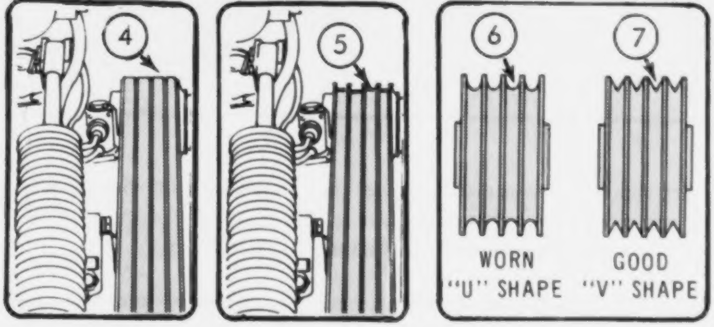
**NOTE: To inspect coolant pump belts you must lie down on left side of engine compartment and lower your head until you can see the belts (VIEW B, page 3-60). VIEW A was made with engine out of vehicle. You must find point Y by touch. You can't see it.**

**3-8. Inspecting Generator and Coolant Pump Belts - continued.**



b. Inspect coolant pump belts for breaks and excessive wear. Check belt tension by pressing at point Y. Belts should depress approximately 1/4-inch. If you need new belts or belt adjustment, see organizational maintenance.

NOTE: Check engine coolant. Fill to line on surge tank when cold. See figure 3-16 (page 3-70).



c. Correct engagement of serviceable drive belts with serviceable drive pulley sheaves (4).

d. Unsatisfactory engagement due to worn out pulley and/or worn out belts (5).

e. "Bottomed out" condition, which can occur from worn out belts on serviceable pulley (5).

f. New belts should not be installed when pulley sheaves are worn (6). The cooling-fan system must be replaced in accordance with MAC to correct the pulley condition.

g. The "bottomed out" condition (5) does occur when only belts are worn out, indicating belt replacement at organizational level. View (7) is serviceable pulley.

### 3-8. Inspecting Generator and Coolant Pump Belts - continued.

h. To avoid early belt wear due to slippage, organizational personnel should insure that belt tensioner spring is fully compressed when new belts are installed.

i. Operators and crewmen should check fan drive-belt tension for "drum-skin" tightness (no deflection) midway between generator and fan drive-pulleys.

j. When belt deflection is present, the generator mounting may be loose or broken. The belt tensioner may have malfunctioned, or belt may be worn out. There is no fan drive-belt adjustment other than maximum spring tension provided by the tensioner.

### 3-9. Cleaning Hull Compartment.

a. Remove loose debris from driver's compartment.

b. Scrub floor and other dirty areas with detergent and a minimum of water.

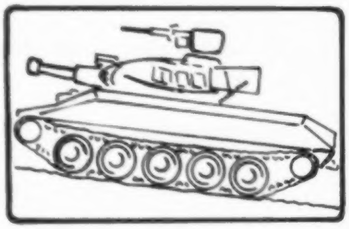
**CAUTION: Do not use water hose or steam in vehicle interior. Protect all electrical items against getting wet.**

**NOTE: During cold weather, operate vehicle engine and personnel heater as required to thaw frozen liquids.**

c. Use front bilge pump to remove liquids during cleaning. However, if front bilge pump is inadequate, rear bilge pumps and/or hull access plugs may be used as follows:

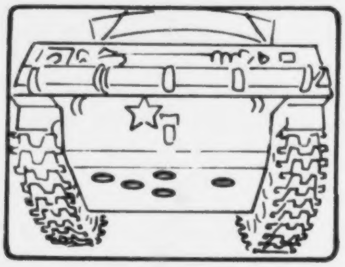
d. Assure that engine bulkhead drain holes are open.

e. Elevate front of vehicle slightly (6 to 10 inches) by driving up an incline.

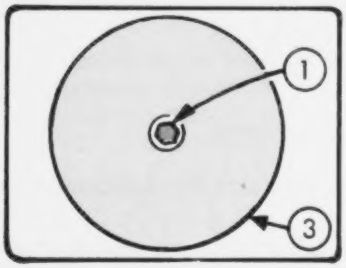


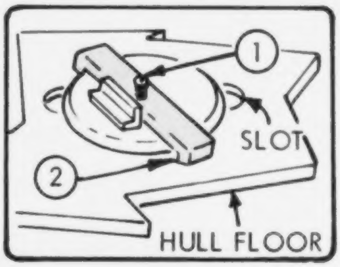
f. Operate rear bilge pumps or remove one or more hull access plugs to drain liquids from engine compartment.

## 3-9. Cleaning Hull Compartment - continued.



NOTE: For removal and installation of hull access plugs, see following steps g through k.





**NOTE: You may have to tap screwhead to loosen bar from hull floor.**

g. Use 9/16-inch socket and turn screw (1) to loosen bar (2).

h. Rotate plug (3) to align bar with slots and remove hull access plugs.

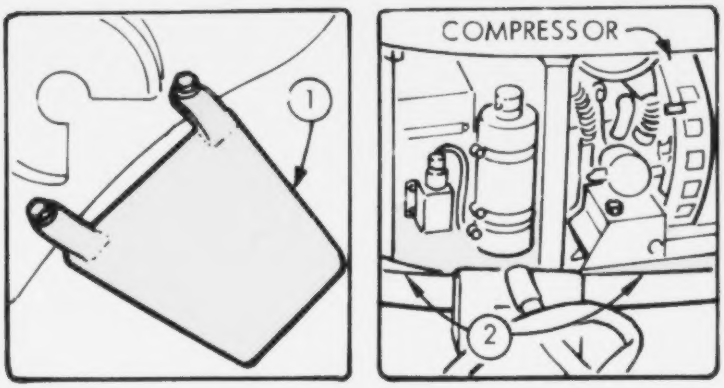
**CAUTION: Access plugs must seat tightly to keep water out during amphibious operation. Notify organizational maintenance to replace worn or damaged packing.**

i. Loosen screw (1) until flush with top of bar (2). Apply grease to screw threads.

j. Insert plug in access hole and turn approximately 90°.

k. Hold plug and tighten screw.

### 3-10. Cleaning Turret Compartment.



**NOTE: If you've got cold weather problems, FIRST start engine and personnel heater . . . wait until frost and ice are thawed.**

a. Remove debris and spent brass from turret floor.

b. Remove access cover (1) from turret floor. Slowly traverse turret manually and remove all debris and spent brass from hull floor.

**CAUTION: Never use a water hose or steam to clean inside of vehicle. Always protect electrical connections, cables, and components from** water, gasoline, diesel fuel, or any similar fluids.

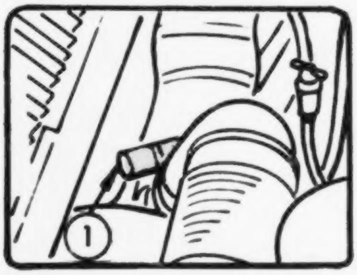
c. Scrub floor and all other dirty areas with detergent and a minimum of water.

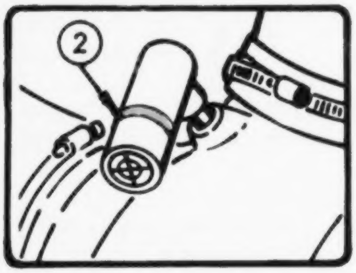
**CAUTION: Keep turret area under compressor (2) clean and dry. Mud or debris could short out the compressor.**

d. After cleaning, drain off liquids with front bilge pump, or rear bilge pumps, or hull access plugs.

## 3-11. Cleaning Radiator With Low-Pressure Air - DELETED

## 3-12. Servicing Engine Air Cleaner.





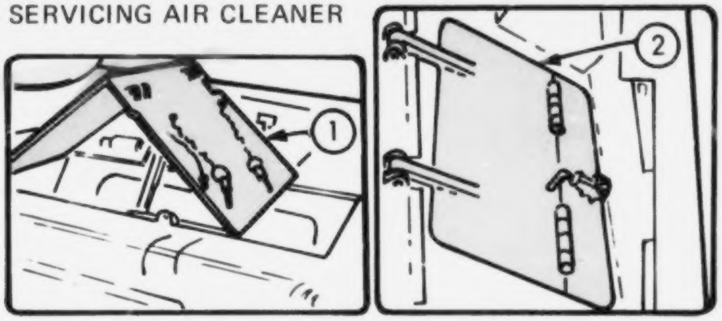
a. Check restriction indicator (1) from engine compartment; open left engine compartment exhaust grille.

**NOTE: Engine must be running when checking restriction indicator.**

Indicator will show a little red (2) when air cleaner is partly restricted; maximum red for full restriction. Service air cleaner when indicator shows red.

## 3-12. Servicing Engine Air Cleaner - continued.

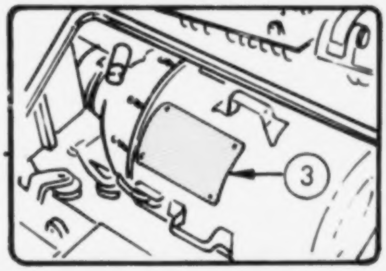
SERVICING AIR CLEANER

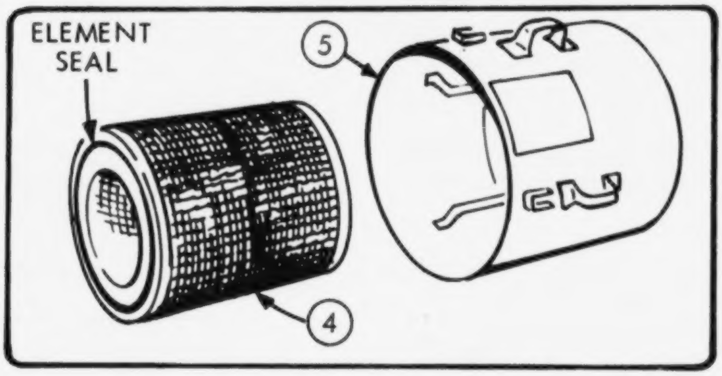


b. If service is required, open cover doors (1) and air cleaner access door (2).

**WARNING: Contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel.**

c. Follow instructions (3) on housing to remove filter.





d. Remove filter element (4) from housing (5). Empty the housing. Clean element with low pressure air

1. Direct a flow of air against inside of element using back and forth motion.

**3-12. Servicing Engine Air Cleaner - continued.**

2. Repeat for outside.

3. Now clean inside again. Some dirt may have blown in when outside was cleaned.

e. If element is caked with dust or soot (or if you don't have low pressure air ), clean as follows:

**CAUTION: Element must not be cleaned in gasoline or other petroleum solvent.**

1. Submerge element in a non-sudsing detergent or soap and water solution; agitate to clean.

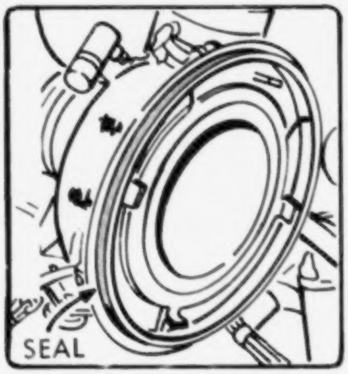
2. Rinse thoroughly, particularly if soap was used.

3. Dry element before installing in housing.

**NOTE: Under emergency conditions, element can be installed in housing after a 5-minute drip period. Prior to operation under dusty condition, idle engine for a short time to complete drying.**

f. Check element seal, housing seal, and element fabric for damage. If damaged, notify organizational maintenance.

g. To install filter, reverse procedure followed in step c. on previous page.



## 3-13. Fuel System Fill/Drain.

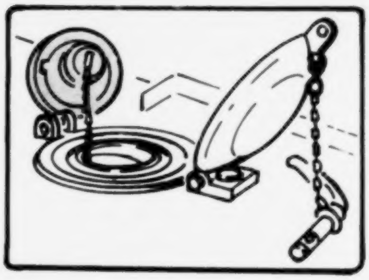
**WARNING:** Clean up spilled fuel before and after operation and at halt in order to prevent fires.

**CAUTION:** Fill each tank to 3 inches below filler neck while parked on level ground.

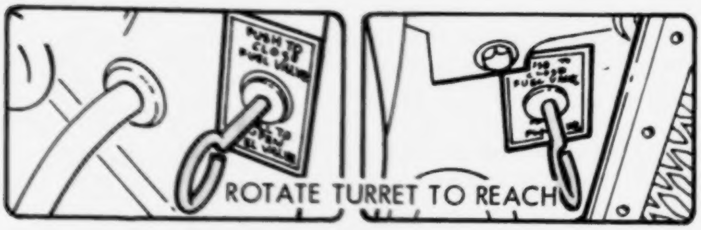
### FILL

**NOTE:** For proper venting when adding fuel, remove both left and right filler caps.

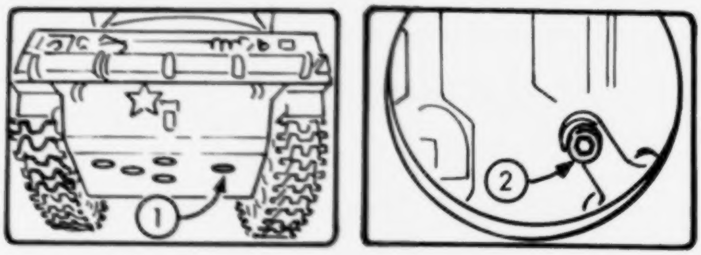
Tanks hold 158 gallons of diesel fuel. Maximum fueling rate is 50 gpm.



### DRAIN


PUSH TO CLOSE FUEL VALVE
PULL TO OPEN FUEL VALVE
ROTATE TURRET TO REACH

a. Open both fuel tank valves located in turret at left and right sides of engine bulkhead.



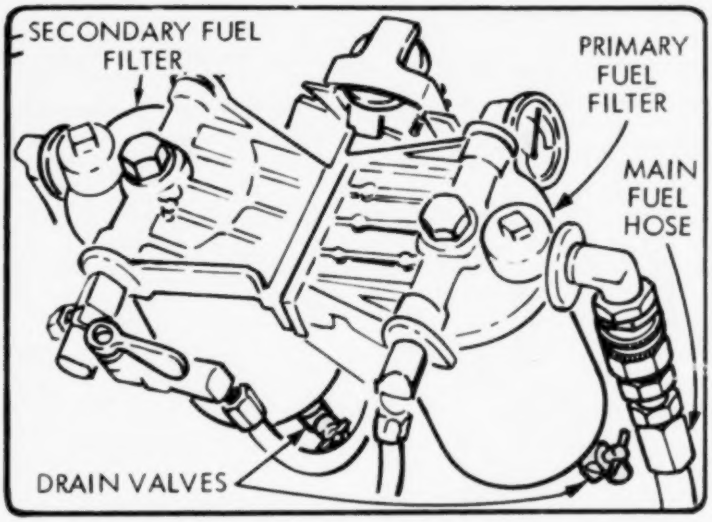
## 3-13. Fuel System Fill/Drain - continued.

b. Remove fuel tank drain access plug (1).

c. Remove outlet hose drain plug (2) and drain fuel into container.

d. Replace outlet hose drain plug and access plug. Close valves.

## 3-14. Draining Engine Fuel Filters.

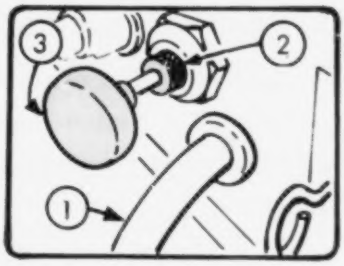

SECONDARY FUEL FILTER
PRIMARY FUEL FILTER
MAIN FUEL HOSE
DRAIN VALVES

a. Open drain valves and drain condensation into container. Drain until you see clear fuel; then close valves.

b. After all water is removed from fuel filters, drain condensation from center fuel tank with fuel drain pump (located in turret).

### 3-15. Draining Center Fuel Tank.

**NOTE: In summer, daily drain the center fuel tank of water. Do this before and after amphibious (swimming) operations.**

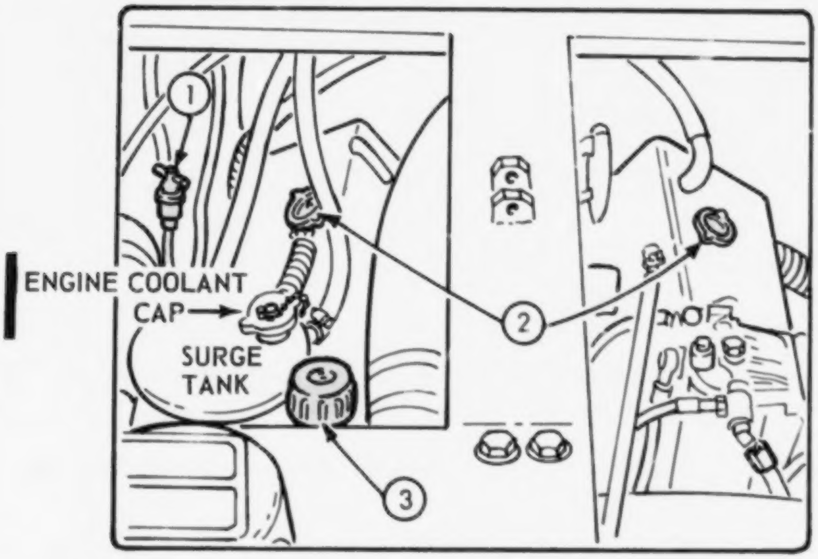


a. Place end of hose (1) in container.

b. Loosen nut (2) at base of handle (3).

c. Pump handle (3). Keep pumping as long as water comes out. Stop when you see clear fuel.

### 3-16. Engine and Transmission Oil.



a. Check engine oil level with dipstick (1) (turn handle and loosen rubber seal to prevent inaccurate reading).

b. Fill, as required at filler caps (2) with proper grade of oil. (See LO 9-2350-230-12.)

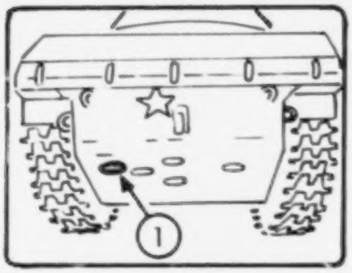
c. Check transmission oil level with dipstick (3).

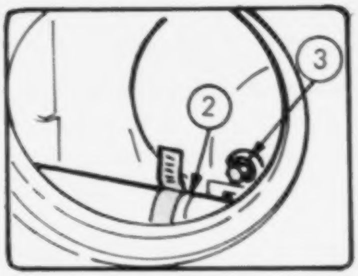
d. Add oil, as required, where oil is checked (3). See LO 9-2350-230-12 for correct level and grade of oil.

**NOTE: Draining oil from either engine or transmission is done by organizational maintenance.**

## 3-17. Draining Engine Breather Drain Collector Box and Inspecting Hull Drain Holes.

ENGINE BREATHER DRAIN COLLECTOR BOX





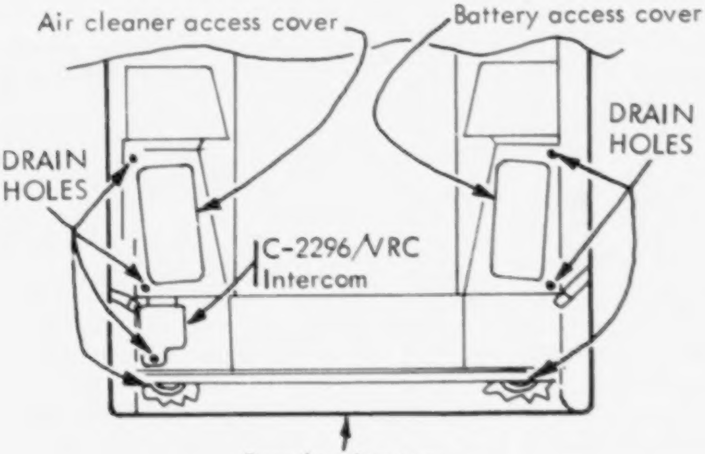
a. Remove engine oil filter access plug (1).

b. Remove outlet (2) from clip.

c. Remove outlet plug (3) and drain condensation.

---

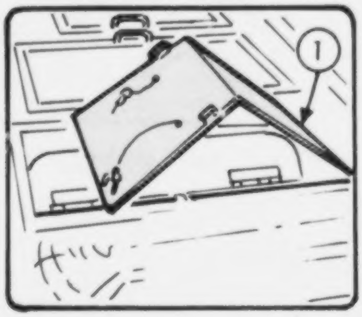
LOCATION OF HULL DRAIN HOLES

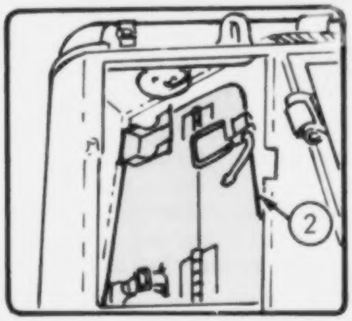

Air cleaner access cover
Battery access cover
DRAIN HOLES
DRAIN HOLES
C-2296/VRC Intercom

Rear barrier tray.

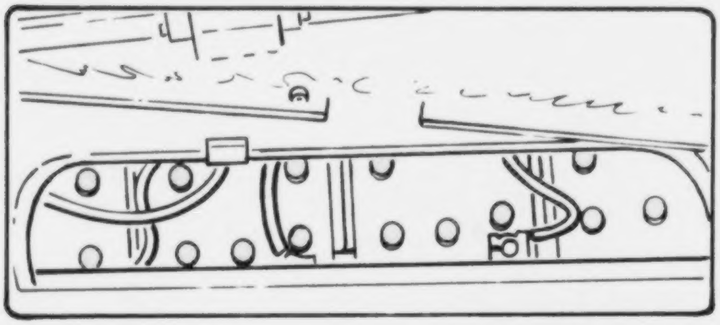
## 3-18. Inspecting Batteries.

**WARNING: Acid fumes and electrolyte are harmful to eyes and skin. Upon contact, immediately wash liberally with water and get to a medic . . . fast!**





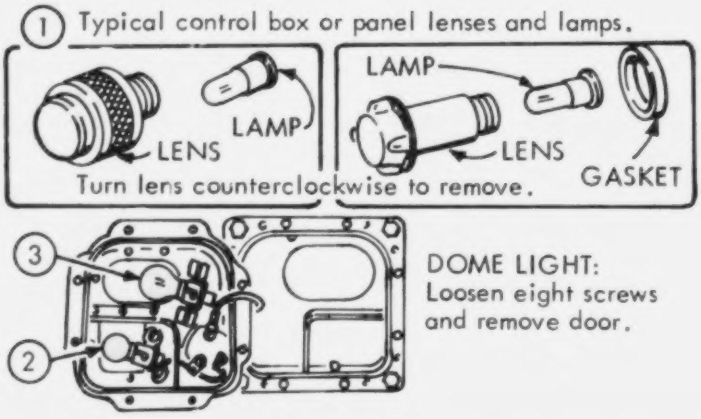
a. To inspect batteries, open cover doors (1) and battery access door (2).



b. Check battery electrolyte level; electrolyte should be up to split ring on battery filler opening. Add water if low. If electrolyte level is repeatedly low or batteries are boiling, notify organizational maintenance. When temperature drops below 32°F, run engine five minutes to allow water added to batteries to mix with electrolyte.

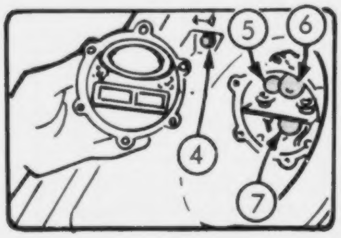
c. Inspect lugs, terminals, and cables for corrosion. Check for loose battery hold-downs and brackets.

### 3-19. Hull Lamp Replacement.

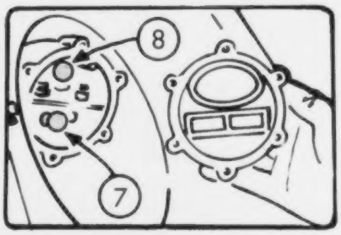

①
Typical control box or panel lenses and lamps.
LAMP
LENS
LAMP
LENS
GASKET
Turn lens counterclockwise to remove.
③
②
DOME LIGHT:
Loosen eight screws
and remove door.

| WHERE USED | NATIONAL STOCK NO.<br>REFERENCE NO. |
|---|---|
| (1) C-2297/VRC intercom set control | 6240-00-155-7967<br>(8168874) |
| (1) Personnel heater control box | 6240-00-950-1678<br>(11621411) |
| (1) Coolant heater control box | 6240-00-950-1678<br>(11621411) |
| (1) Driver's indicator panel | 6240-00-155-7836<br>(MS 25237-327) |
| (1) Driver's switch panel | 6240-00-155-7836<br>(MS 25237-327) |
| (2) Dome light (red lens) | 6240-00-019-3093<br>(MS 15570-623) |
| (3) Dome light (white lens) | 6240-00-295-2668<br>(MS 35478-1691) |

## 3-19. Hull Lamp Replacement - continued.

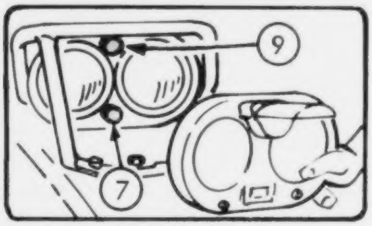


a. Loosen six screws and remove door to replace left taillight.



b. Loosen six screws and remove door to replace right taillight.

c. Loosen four screws and remove cover to replace headlight.



| WHERE USED | NATIONAL STOCK NO.<br>REFERENCE NO. |
|---|---|
| (4) C-2296/VRC intercom set control | 6240-00-155-7967<br>(8168874) |
| (5) Service taillight | 6240-00-019-0877<br>(MS 15570-1251) |
| (6) Service stoplight | 6240-00-044-6914<br>(MS 35478-1683) |
| (7) Blackout marker light | 6240-00-019-0877<br>(MS 15570-1251) |
| (8) Blackout stoplight | 6240-00-019-0877<br>(MS 15570-1251) |
| (9) Blackout drive light | 6240-00-044-6914<br>(MS 35478-1683) |

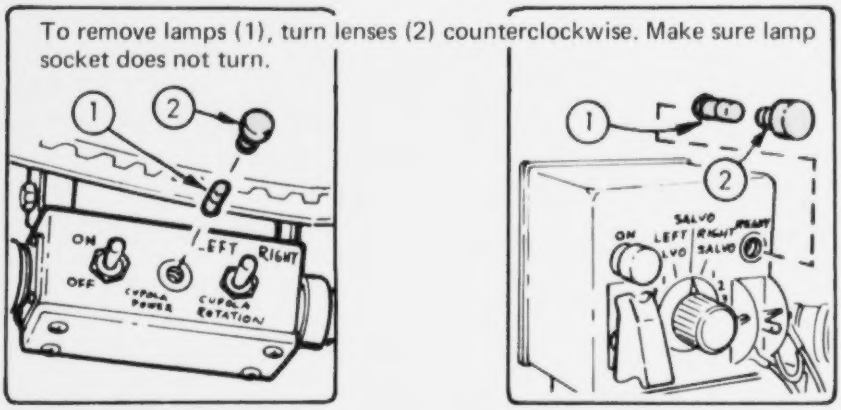
### 3-20. Turret Lamp Replacement.

Refer to table 3-3 and figure 3-1 (starting on pages 3-75 and 3-76) for turret lamp replacement data.

Table 3-3. Turret Lamp Replacement

| Qty | Description | NSN of lamp | Figure 3-1 |
|---|---|---|---|
| 1 | Cupola control assembly | 6240-00-155-7836 | A |
| 2 | Grenade launcher control assembly | 6240-00-155-7836 | B |
| 7 | Gun & turret selector box | 6240-00-080-2012 | C |
| 1 | Gunner's ready light | 6240-00-155-7836 | D |
| 3 | Dome light (white lens) (1 lamp each dome light) | 6240-00-295-2668 | E |
| 3 | Dome light (red lens) (1 lamp each dome light) | 6240-00-019-3093 | E |
| 15 | Missile remote control test set | 6240-00-155-7836 | F |
| 1 | Checksight lamp | 6240-00-909-5473 | F |
| 1 | Loader's control box | 6240-00-155-7836 | G |
| 2 | Azimuth indicator | 6240-00-051-4843 | H |
| 4 | Panel assembly (periscope XM44 series) | 6240-00-155-7836 | I |
| 1 | Periscope XM44 series | 1240-00-817-9803 | J |
| 2 | Telescope M119 or M127 | 6240-00-921-4493 | K |
| 2 | Receiver-transmitter RT-246(*)/VRC | 6240-00-155-7836 | L |
| 2 | Receiver-transmitter RT-524(*)/VRC | 6240-00-155-7836 | M |
| 2 | Radio receiver R-442(*)/VRC | 6240-00-155-7836 | N |
| 1 | Audio frequency amplifier AM-1780/VRC | 6240-00-155-7836 | O |

### 3-20. Turret Lamp Replacement - continued.

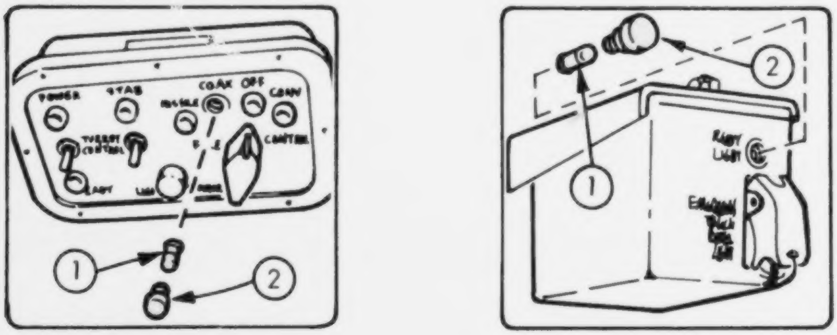


To remove lamps (1), turn lenses (2) counterclockwise. Make sure lamp socket does not turn.

1
2
ON
OFF
LEFT
RIGHT
CUPOLA POWER
CUPOLA ROTATION
1
2
SALVO
ON
LEFT
RIGHT
READY
SALVO

A. Cupola control assembly.

B. Grenade launcher control assembly.

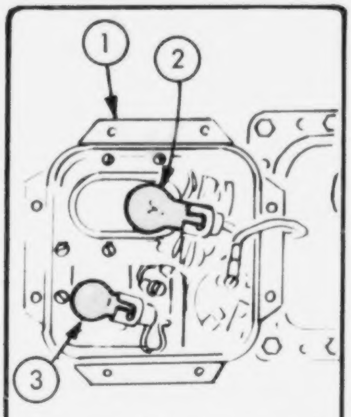


POWER
STAB
COAX
OFF
TURRET CONTROL
CONTROL
1
2
READY
LIGHT
1
2

C. Gun and turret selector box.

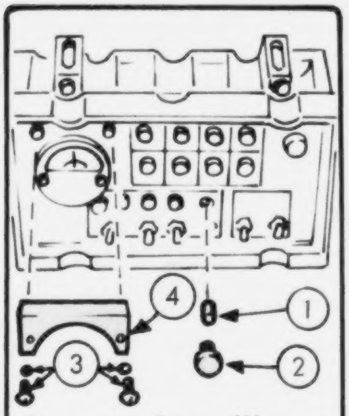
D. Gunner's ready light.

Figure 3-1. Turret Lamp Replacement (Sheet 1 of 4)



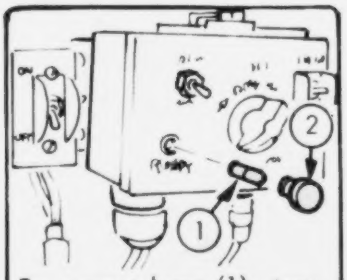
Loosen eight screws and fold back door assembly (1). Remove lamp (2) (white lens) or lamp (3) (red lens).

E. Dome lights.



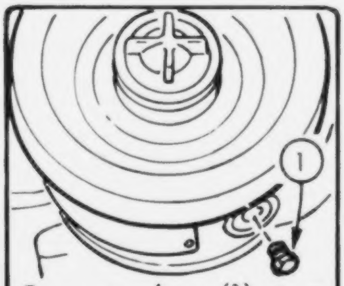
To remove lamps (1), turn lenses (2) counterclockwise. To replace meter lamps, first remove two screws and washers (3) and cover (4).

F. Missile remote control test set.



To remove lamp (1), turn lens (2) counterclockwise.

G. Loader's control box.

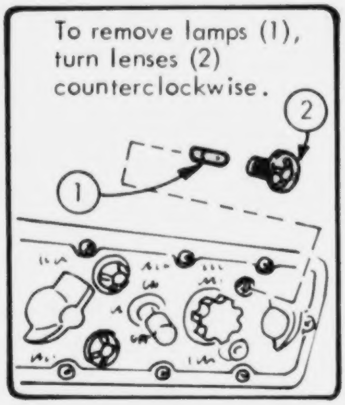


To remove lamp (1), turn counterclockwise.

H. Azimuth indicator.

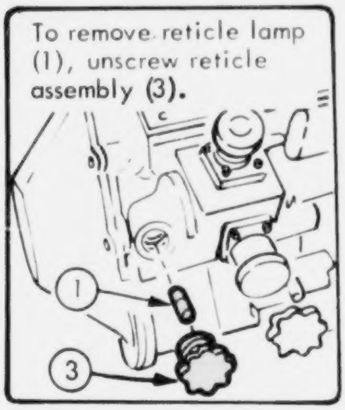
Figure 3-1. Turret Lamp Replacement (Sheet 2 of 4)

## 3-20. Turret Lamp Replacement - continued.



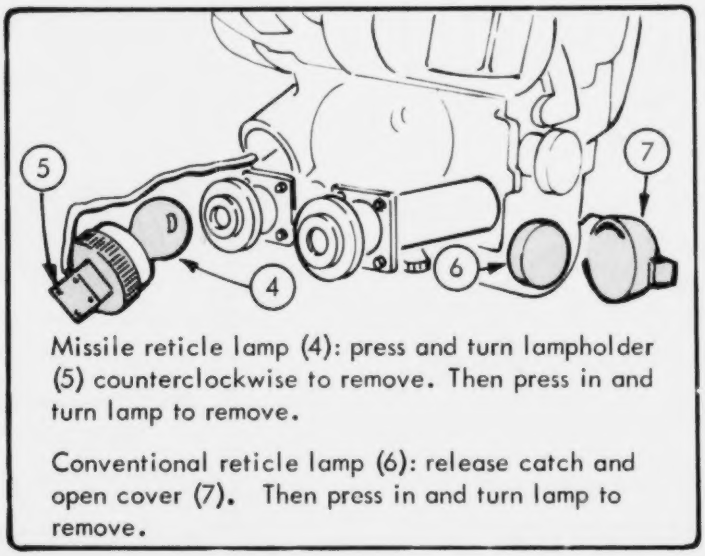
To remove lamps (1), turn lenses (2) counterclockwise.

I. Periscope XM44 series panel assembly.



To remove reticle lamp (1), unscrew reticle assembly (3).

J. Periscope XM44 series.



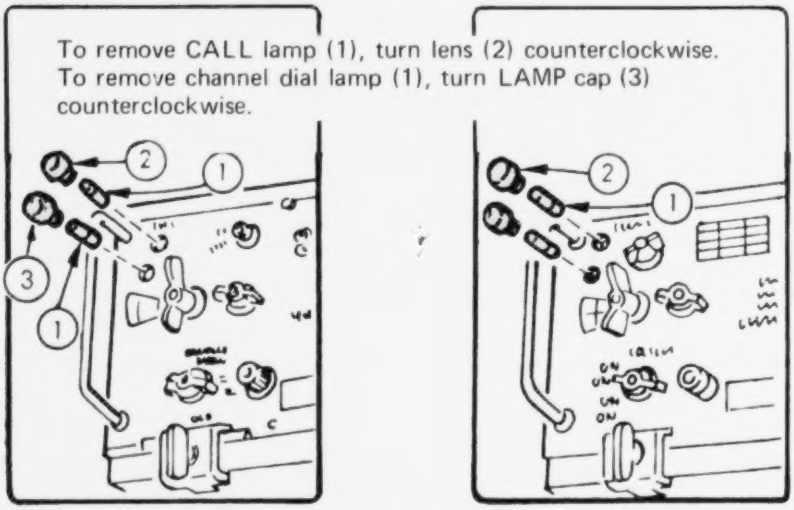
Missile reticle lamp (4): press and turn lampholder (5) counterclockwise to remove. Then press in and turn lamp to remove.

Conventional reticle lamp (6): release catch and open cover (7). Then press in and turn lamp to remove.

K. Telescope M119 or M127.

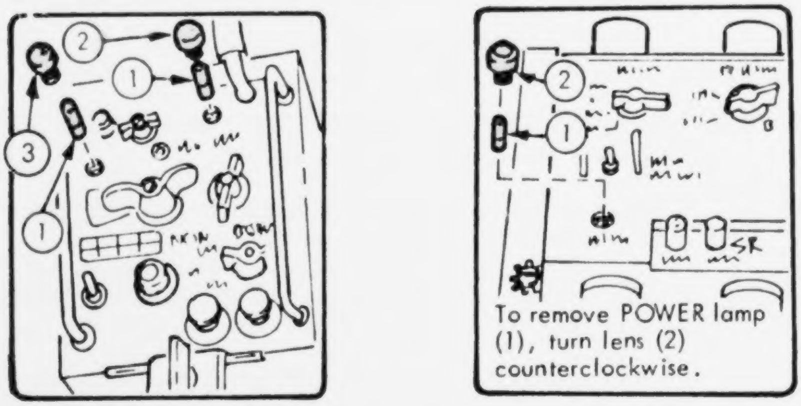
Figure 3-1. Turret Lamp Replacement (Sheet 3 of 4)

### 3-20. Turret Lamp Replacement - continued.


To remove CALL lamp (1), turn lens (2) counterclockwise.
To remove channel dial lamp (1), turn LAMP cap (3) counterclockwise.

L. Radio Receiver-transmitter RT-246(*)/VRC.

M. Radio receiver-transmitter RT-524(*)/VRC.



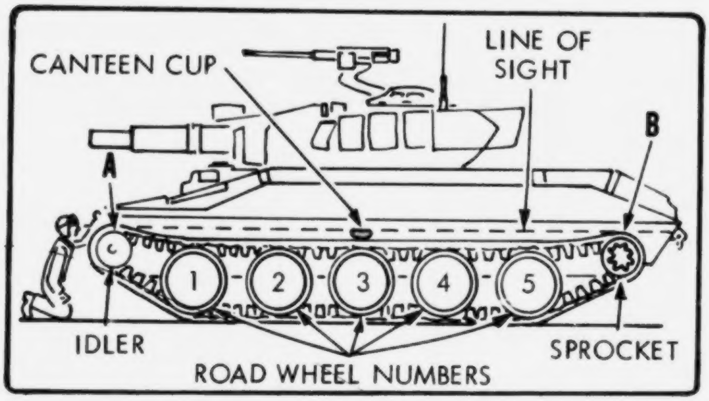
To remove POWER lamp (1), turn lens (2) counterclockwise.

N. Radio receiver R-442(*)/VRC.

O. Audio frequency amplifier AM-1780/VRC.

Figure 3-1. Turret Lamp Replacement (Sheet 4 of 4)

## 3-21. Tracks.



a. Checking Track Tension.

**NOTE: Sag in track between idler and sprocket must be kept between 3-1/2 and 4 inches at no. 3 road wheel. Check track tension before and after vehicle operation as follows:**

1. Locate the vehicle on hard-face ground or pavement and allow it to coast to a stop before checking track tension.

2. Place canteen drinking cup flat (3-1/2-inch dimension) on track directly over no. 3 road wheel.

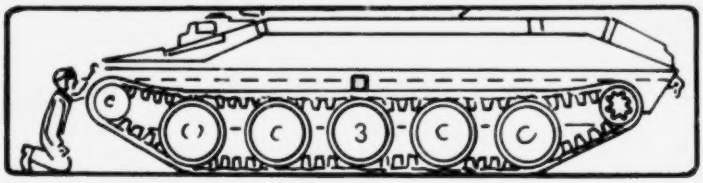
3. Push in front mud guard and sight from point A (top of track on idler) to point B (top of track on sprocket).

   (a) If top of canteen cup is in line with line-of-sight, track adjustment is correct.

   (b) If top of canteen cup is above line-of-sight, track is too tight. Decrease track tension, step 6. on page 3-81, as required.

   (c) If top of canteen cup is below line-of-sight, track may be too loose. Check by following step 4. on page 3-81, as a double check.

## 3-21. Tracks - continued.



4. Place canteen cup upright (4-inch dimension) on track directly over no. 3 roadwheel.

   (a) OK, if cup obscures line-of-sight.

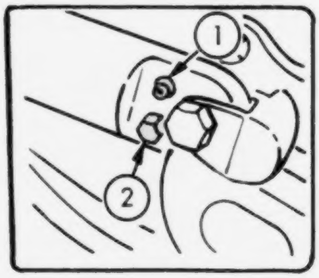
   (b) If top of cup is on or below line-of-sight, track is too loose. Proceed to step 5. below and repeat step 3. on page 3-80).

5. Pump grease into fitting 1. on track hydraulic adjuster until tension is adjusted (steps 2. through 4. starting on page 3-80).

**NOTE: If track sag cannot be taken up, decrease track tension, remove one track shoe, and adjust track tension.**

**WARNING: Do not stand in front of track hydraulic adjuster plug while releasing. Plug is under pressure and could come off with great force.**

6. Open pressure bleed plug (2) on track hydraulic adjuster and reduce pressure until tension is adjusted (step 3, page 3-80). Tighten plug.

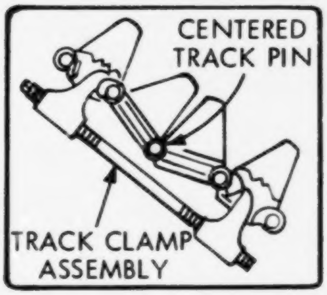


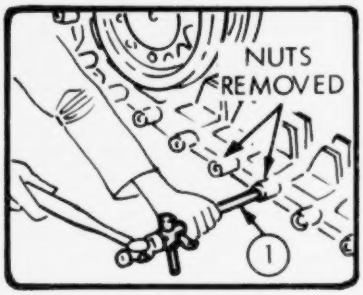
b. Remove A Track Shoe.

1. Remove a track shoe by decreasing track tension (paragraph 3-21 steps 5. and 6., above, and installing clamp assembly (paragraphs 3-21, d., steps 1., 2., and 3., starting on page 3-83) and then continuing as follows:

**3-21. Tracks - continued.**

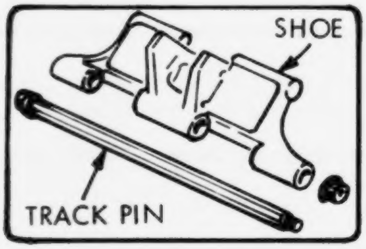
2. Remove outside track pin nuts from adjacent track pins securing one shoe.


CENTERED
TRACK PIN
TRACK CLAMP
ASSEMBLY


NUTS
REMOVED
1

3. Drive out track pin centered in clamp assembly; then withdraw drift-pin (1).

4. Tap shoes with hammer or pry with crowbar to separate shoes. If necessary, loosen clamp assembly to disengage shoes.


SHOE
TRACK PIN

5. Drive out second track pin and remove shoe from track.

6. Tighten clamp assembly while guiding loose shoe into position with fixed shoe. Use crowbar if necessary.

7. Install driftpin through track shoe bushings from vehicle side of track.

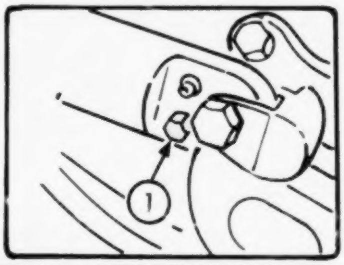
8. To align track shoes for insertion of track pin, refer to paragraph 3-21, d, steps 7 thru 11, page 3-85.

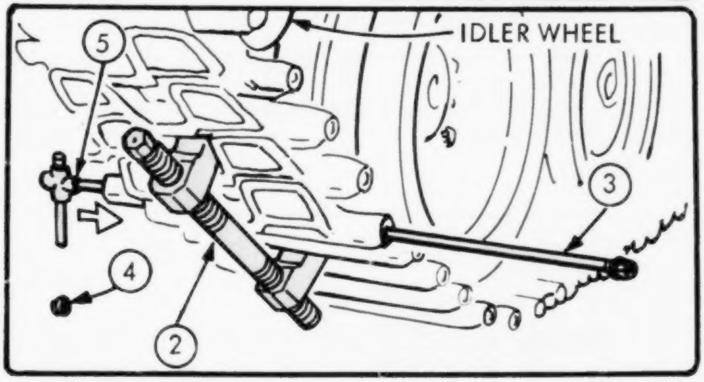
## 3-21. Tracks - continued.

c. Removing Track.

1. Bring vehicle to a coasting stop on level ground without applying brake. Block track on other side.

2. Loosen pressure bleed plug (1) on track adjuster to decrease track tension.





3. Install clamp assembly (2) between idler wheel and no. 1 road wheel. Using wrench socket 5120-00-189-7914 and handle 5120-00-236-7590, tighten to relieve tension from track pin (3).

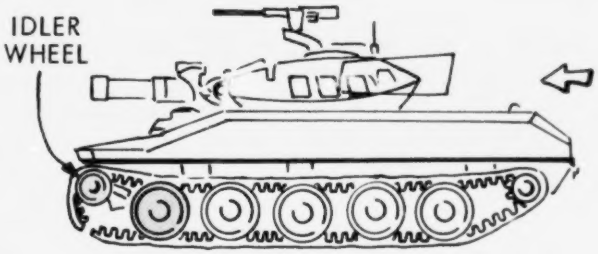
4. Remove one track pin nut (4) and carefully drive track pin (3) out, using driftpin (5) 5120-00-678-2795.

5. Remove clamp assembly (2) and block from opposite track. Drive vehicle slowly rearward until clear of track.

d. Installing Track.

1. Drive vehicle forward slowly onto track until rear end of track on ground may be raised over and engaged with drive sprocket.

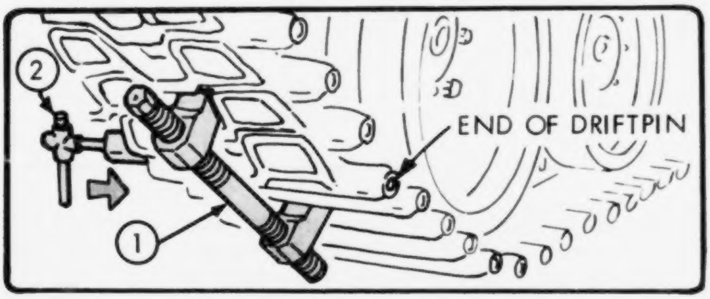
## 3-21. Tracks - continued.



2. Continue driving forward guiding track over road wheels; stop when end of track on ground is midway between idler wheel and no. 1 road wheel.

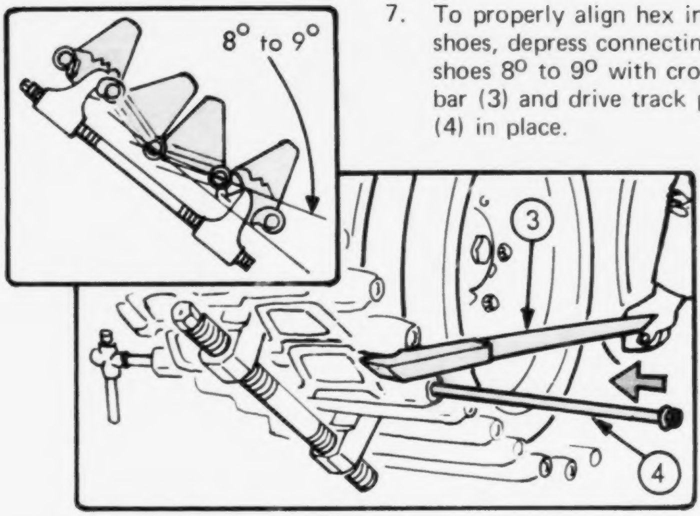
3. Shut off engine; leave parking brake off. Block opposite track.

4. Insert crowbar through track and pry forward over idler wheel to pull track tight.



5. Install clamp assembly (1) and tighten until track pin holes are aligned, using wrench 5120-00-189-7914 and handle 5120-00-236-7590.

6. Drive driftpin (2) from behind, through track pin holes, until flush with front face of shoe.



7. To properly align hex in shoes, depress connecting shoes 8° to 9° with crowbar (3) and drive track pin (4) in place.

8. Install one track pin nut and tighten.

9. Remove clamp assembly and adjust track tension (paragraph 3-21, a., starting on page 3-80.

10. Use paint to mark track shoes where nuts have been disturbed.

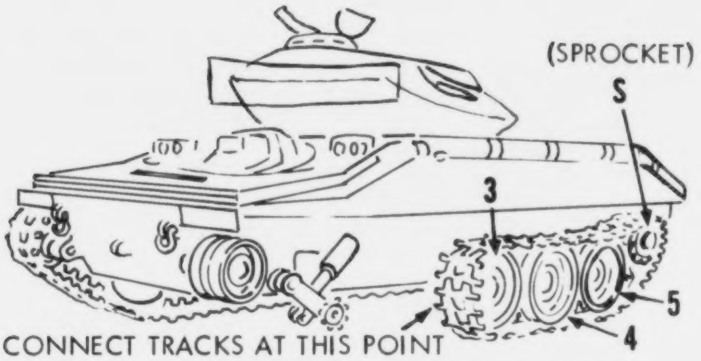
11. As soon as possible, notify organizational maintenance to torque disturbed nuts to 120 to 130 lb-ft, and again after 50 miles.

e. Emergency Short-Tracking.

**NOTE: A vehicle with track blown off, damaged road wheels, or broken idler wheel can be short-tracked and still drivable (steps 8, 9, and 10, starting on page 3-87). The following are operable sprocket and road wheel combinations (0 indicates removed road wheel). Number of track shoes required is in parentheses.**

**NOTE: The left track requires two more shoes than right track due to offset of torsion bars.**

**3-21. Tracks - continued.**

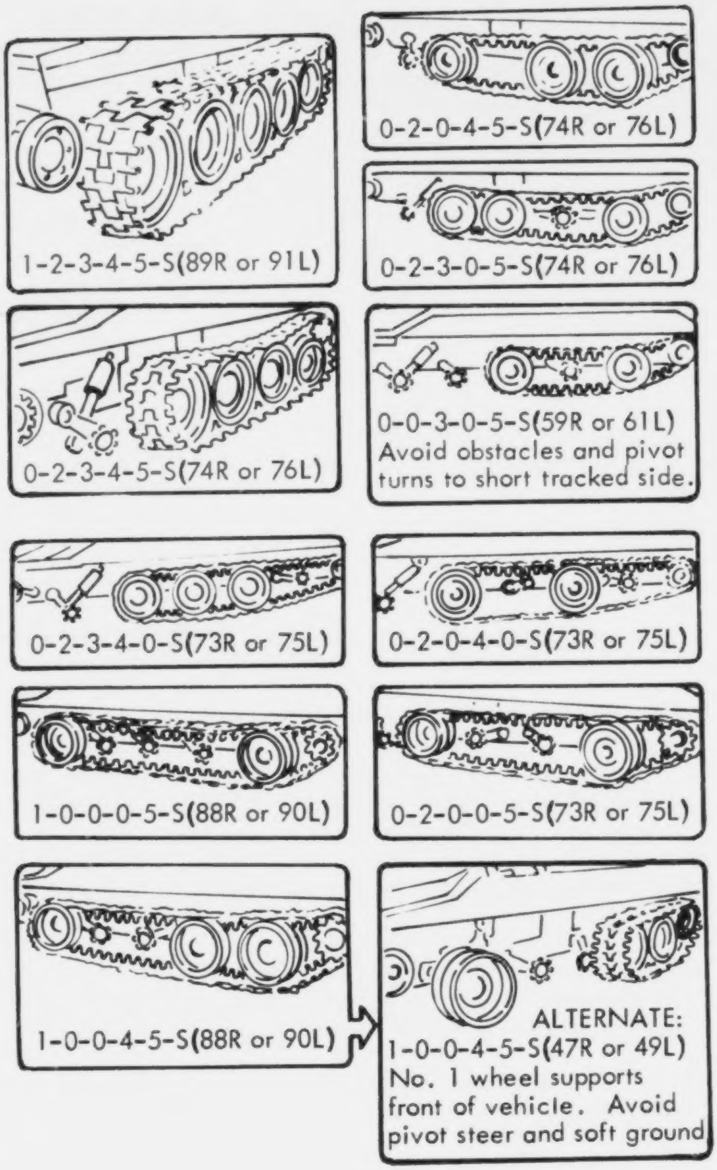


Combination 0-0-3-4-5-S (60R or 62L) Avoid pivot turns to short-tracked side. Approach obstacles slowly.

1. Select section of track to be used. If track is damaged, select least damaged shoes: Remove remainder of track and stow on vehicle.
2. Maneuver and align section of track in front of road wheels.

**NOTE: It may be necessary to break track into smaller sections for handling. Reconnect sections.**

3. Drive vehicle slowly forward onto track.
4. As soon as vehicle position on track permits, guide rear end of track over sprocket so sprocket teeth engage track (use track pin or driftpin to guide track).
5. Drive vehicle slowly forward, guiding top of track to 7:00 to 7:30 o'clock position at front of lead road wheel.
6. Using clamp assembly, pull ends of track together. To connect track, remove some slack as follows: Block behind leading road wheel, between wheel and track. Steer away from short-tracked side, and very carefully apply power in forward gear to tighten track. Install track pin (preceding paragraph 3-21 d., steps 7. through 11., starting on page 3-85).
7. Tie up any remaining road wheel arms to avoid interference with obstacles and damage to spindles and arms.


1-2-3-4-5-S(89R or 91L)
0-2-0-4-5-S(74R or 76L)
0-2-3-0-5-S(74R or 76L)
0-2-3-4-5-S(74R or 76L)
0-0-3-0-5-S(59R or 61L)
0-2-3-4-0-S(73R or 75L)
0-2-0-4-0-S(73R or 75L)
1-0-0-0-5-S(88R or 90L)
0-2-0-0-5-S(73R or 75L)
1-0-0-4-5-S(88R or 90L)
ALTERNATE:
1-0-0-4-5-S(47R or 49L)

Avoid obstacles and pivot turns to short tracked side.

No. 1 wheel supports front of vehicle. Avoid pivot steer and soft ground

Operation of Short-Tracked Vehicle

(8) Do not exceed 10 mph forward, 4 mph reverse, or 2 mph over an obstacle. Pivot steering and crossing obstacles are normal except with certain combinations of wheels (see panels).

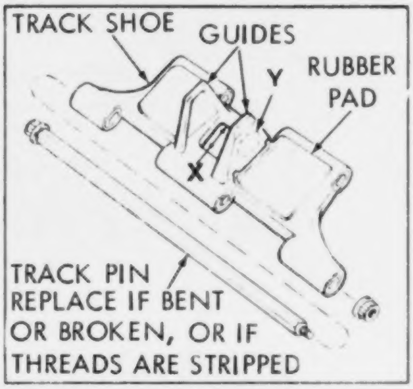
9. Avoid pivot turns toward short-tracked side, when possible.

10. Steering will react slowly when toward full-tracked side; quickly toward short-tracked side.

f. Criteria for Track Shoe Replacement.

1. When both track shoe guides are missing on a single shoe, or when three or more guides in a row are damaged, the shoe(s) should be replaced.

2. A guide is considered missing when 75% of guide is gone, and is considered damaged if more than 1/3 of guide is missing, or guide is bent and interferes with related components. Replace shoe if thickness of guide at point "Y" is less than 1/8-inch.



TRACK SHOE AND PIN DETAIL.

3. Shoes with wear notch in sprocket opening at point "X" deeper than 5/32-inch are to be replaced.

4. If 25 or more guides are missing, the entire track should be replaced.

5. In cases of emergency, three or more consecutive shoes with missing or damaged guides may be separated and relocated pending later replacement.

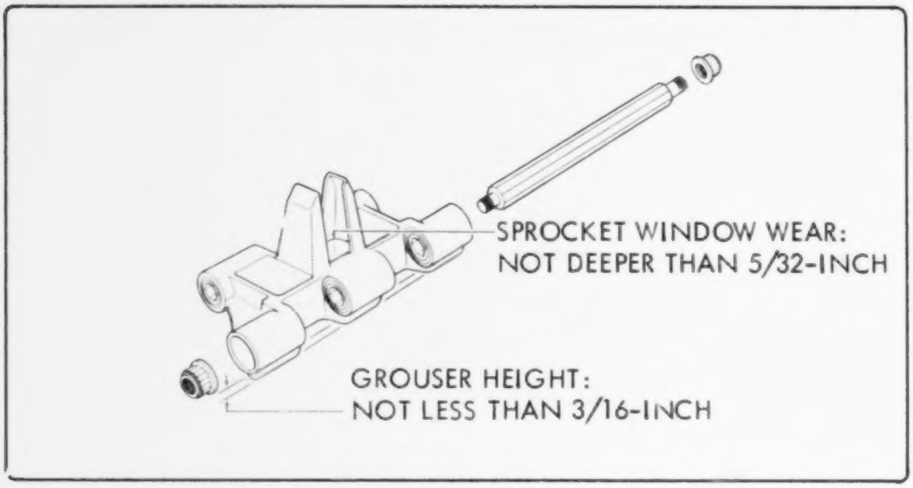
6. When rubber pads are missing from guide side of track shoe, replace shoe.

7. When 10% of rubber pads are missing from road side of one track assembly, replace all shoes involved. Replace shoes when grouser-height is less than 3/16-inch.

8. When rubber pads are missing from three or more consecutive shoes, replace shoes or intermix with good shoes.

3-21. **Tracks - continued.**

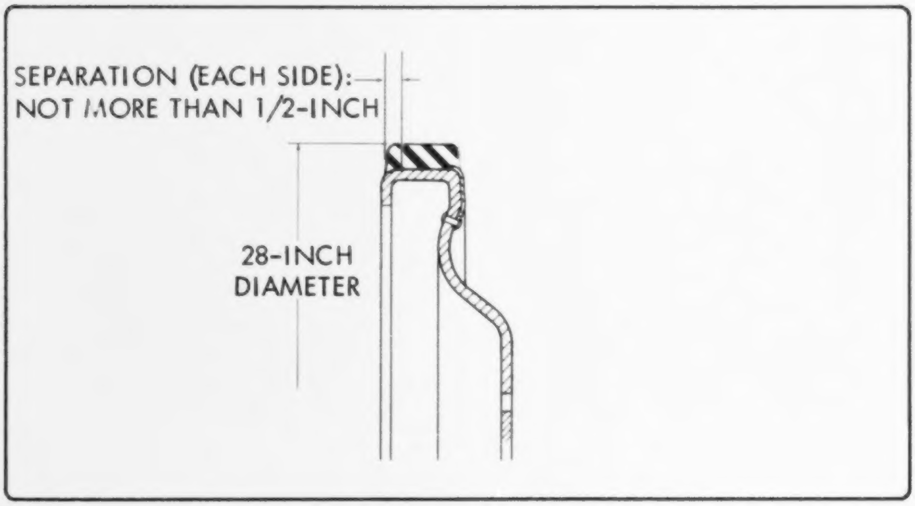
g. Track Inspection Criteria.


SPROCKET WINDOW WEAR:
NOT DEEPER THAN 5/32-INCH
GROUSER HEIGHT:
NOT LESS THAN 3/16-INCH

POINT OF REFERENCE AND TRACK WEAR LIMITS

h. Roadwheel Inspection Criteria.

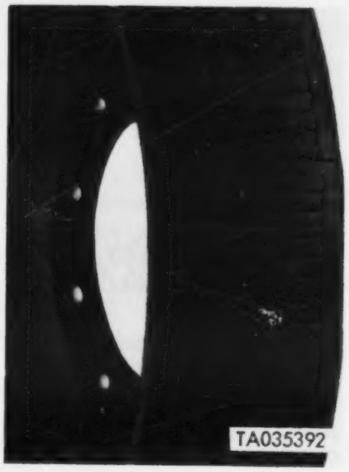
1. Inspect roadwheels for wear using measurements shown below. Examples of unserviceable roadwheels are illustrated on pages 3-89 thru 3-92.


SEPARATION (EACH SIDE):
NOT MORE THAN 1/2-INCH
28-INCH
DIAMETER

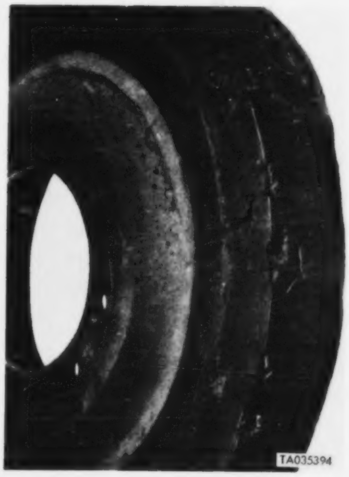
ROADWHEEL WEAR LIMITS

## 3-21. Tracks - continued.

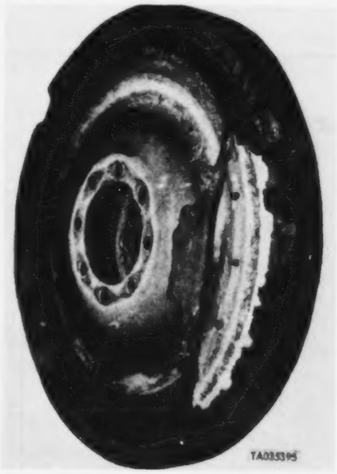
### TYPICAL DAMAGE TO IDLER AND ROADWHEELS



UNSERVICEABLE ROADWHEEL - Weather cracks extending completely across tread surface.



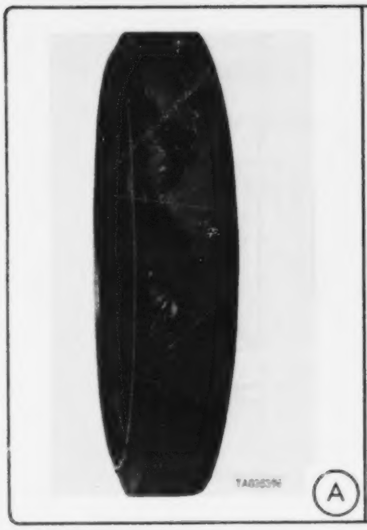
UNSERVICEABLE ROADWHEEL - Chunking in excess of 20 percent



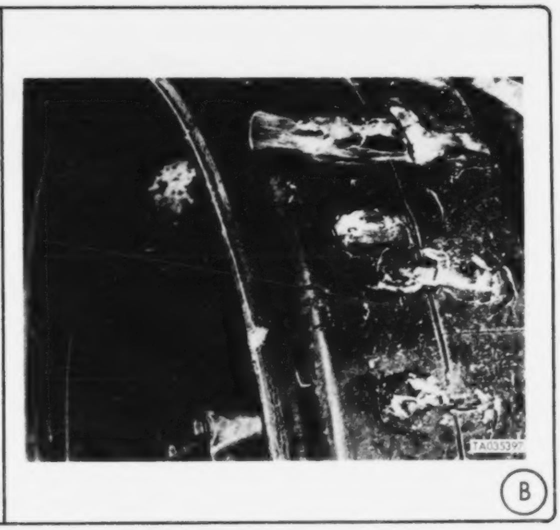
UNSERVICEABLE ALUMINUM ROADWHEEL - Replaceable wear flange worn through.

**3-21. Tracks - continued.**

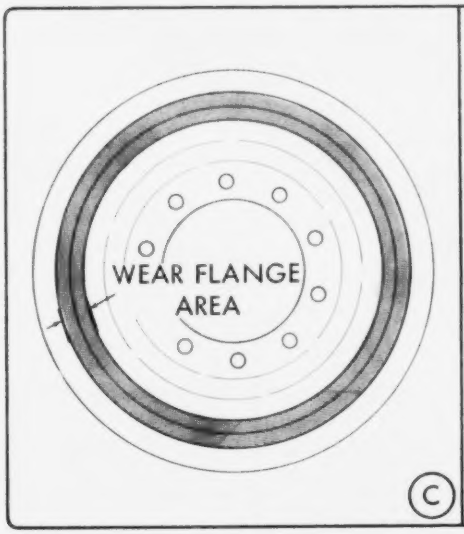
### TYPICAL DAMAGE TO ROADWHEELS



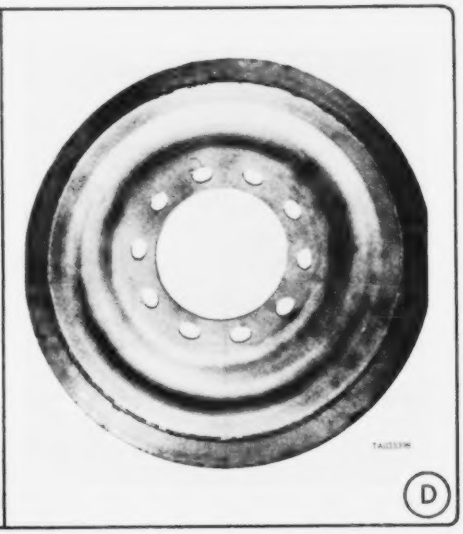
UNSERVICEABLE ROADWHEEL - Chunking more than half the width of the tire.



UNSERVICEABLE ROADWHEEL - Damaged tread surface and chunking extending completely across tread.

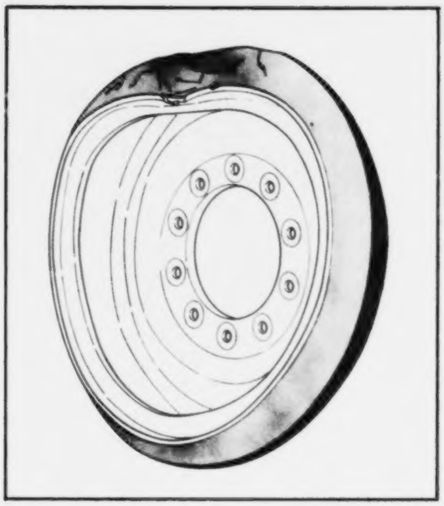


UNSERVICEABLE ROADWHEEL Wear flange worn beyond acceptable limits.



UNSERVICEABLE ROADWHEEL - Elongated bolt holes.

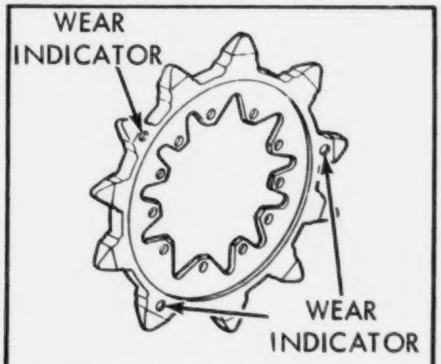
**3-21. Tracks - continued.**



UNSERVICEABLE ROADWHEEL - Bent.

i. Sprocket Inspection.

Two types of sprockets may be issued with the M551/M551A1 vehicle. One type of sprocket has wear indicators and the other type must be gaged. If your vehicle does not have wear indicators, organizational maintenance must gage the sprocket, otherwise check for wear as explained below.

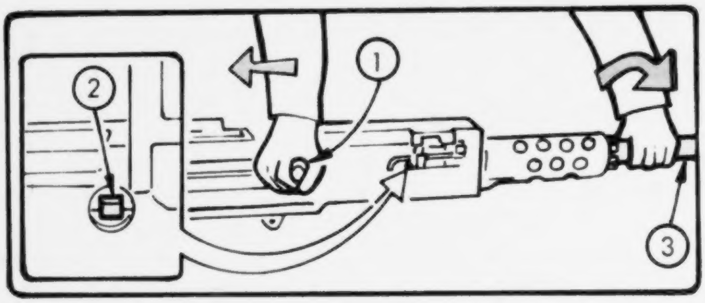


REPLACEMENT SPROCKET W/BUILT-IN WEAR INDICATOR. REVERSE SPROCKET WHEN WORN TO INDICATOR. REPLACE SPROCKET WHEN WORN TO INDICATOR BOTH WAYS.

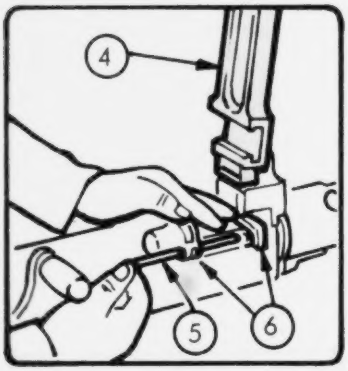
**3-22. Cal .50 Machine Gun - continued.**

a. Disassembly of Cal .50 Machine Gun.

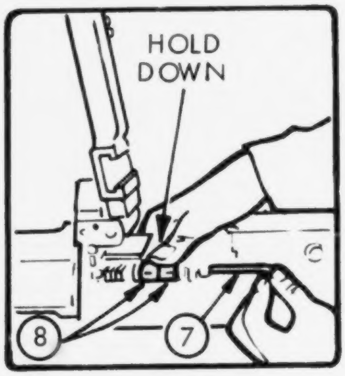
1. Clear weapon before disassembly.



2. Pull retracting slide handle (1) to the rear until lug (2) on barrel locking spring is visible and centered in hole. Twist barrel (3) and remove.



3. Raise cover (4) and remove belt holding pawl pin (5) and link stripper group (6).

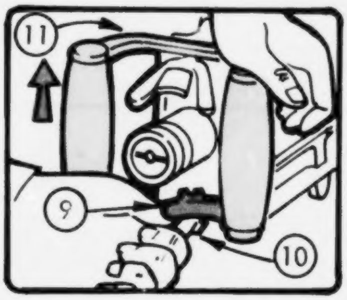


4. Remove belt holding pawl pin (7), belt holding pawls, and spring (8).

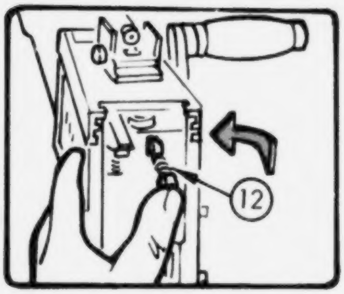
**CAUTION: Make certain bolt is forward before next disassembly step.**

**WARNING: Weapon must not be cocked.**

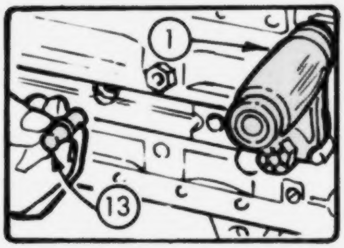
**3-22. Cal .50 Machine Gun - continued.**



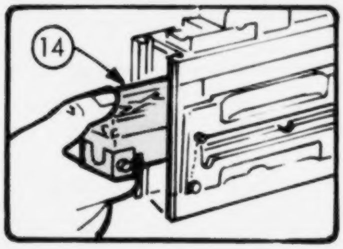
5. Pull out lock (9), up on latch (10), and slide back plate (11) from grooves.



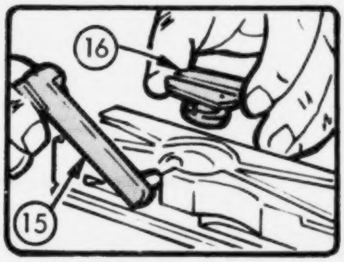
6. Push driving spring rod (12) forward and to the left until free from hole in receiver and remove.



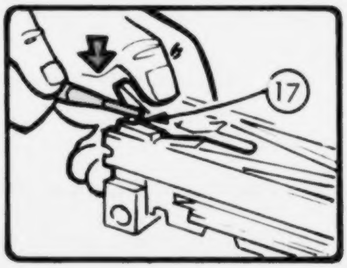
7. Retract slide handle (1) until bolt stud (13) is aligned with slot in receiver. Remove stud.



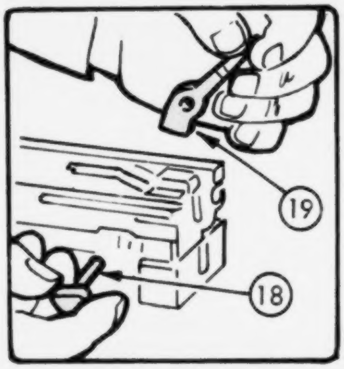
8. Push bolt (14) to rear and remove.



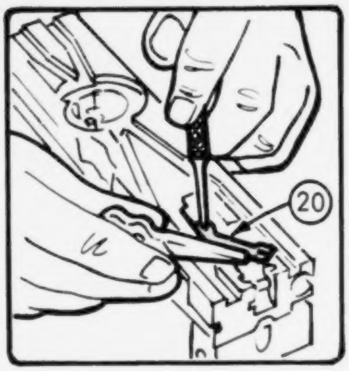
9. Remove extractor (15) and bolt switch (16).



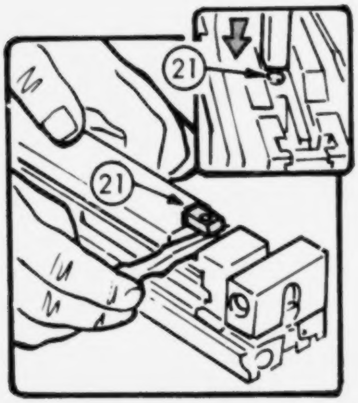
10. Release firing pin (spring) by depressing sear (17).



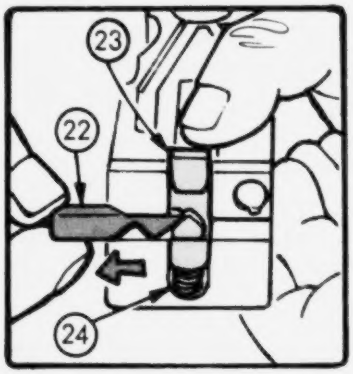
11. Remove cocking lever pin (18) with punch. Remove cocking lever (19).



12. Remove accelerator stop lock (20) by depressing and rotating to center of bolt. Pry up using thin end of cocking lever.

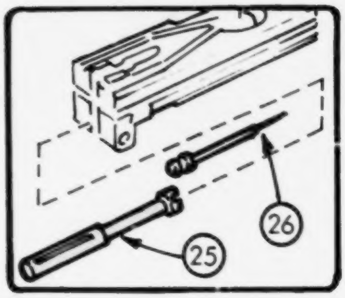


13. Push accelerator stop (21) using cocking lever. Turn bolt over and then pry from bolt.

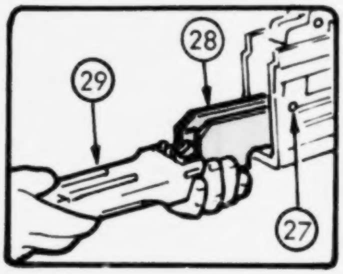


14. Remove sear slide (22), sear (23), and sear spring (24).

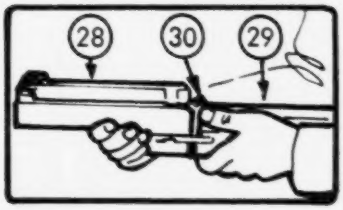
## 3-22. Cal .50 Machine Gun - continued.



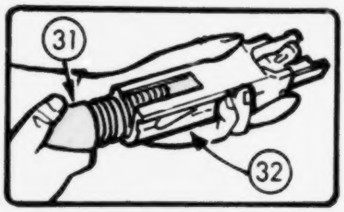
15. Remove firing pin extension (25) with firing pin (26), and separate.



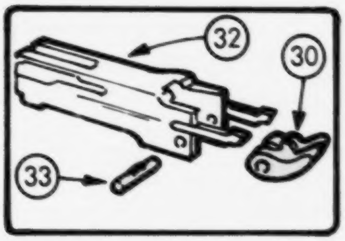
16. Using a dummy cartridge depress buffer body lock (27) and push barrel extension (28) to rear. Remove buffer (29) with barrel extension.



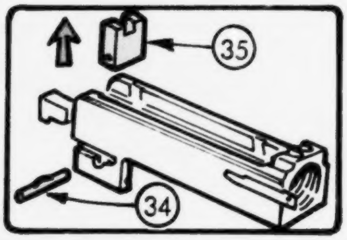
17. Push forward on tops of accelerator (30) and disconnect buffer (29) from barrel extension (28).



18. Remove buffer (31) from buffer body (32).

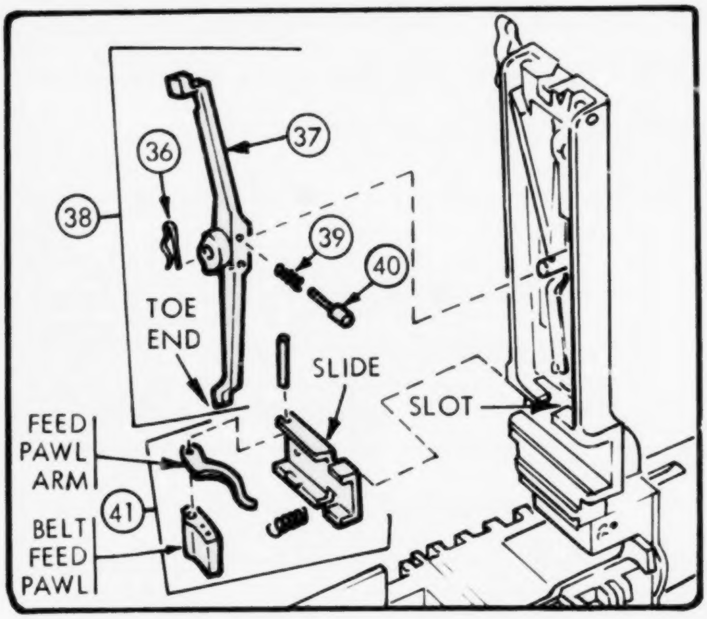


19. Remove pin (33) and accelerator (30) from buffer body (32).



20. Remove pin (34) and breech lock (35) from barrel extension.

## 3-22. Cal .50 Machine Gun - continued.


(37)
(36)
(38)
(39)
(40)
TOE END
SLIDE
SLOT
FEED PAWL ARM
(41)
BELT FEED PAWL

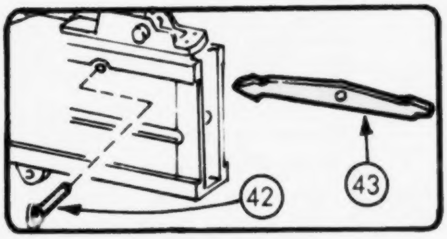
**CAUTION: Make sure spring (39) and pin (40) do not fly out.**

21. Remove lock pin (36). Align toe of lever (37) with slot. Using screwdriver to hold pin (40), remove belt feed lever group (38).

22. Remove and disassemble belt feed slide (41).

23. Turn trigger bar pin (42); pull out. Remove trigger bar (43).

    That's all folks.

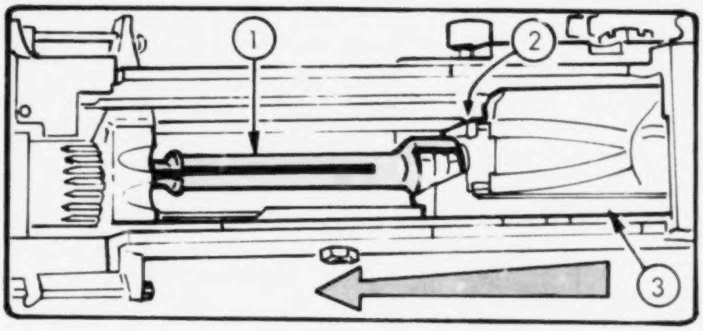


24. Reassemble cal .50 machine gun by reversing disassembly instructions.

**3-22. Cal .50 Machine Gun - continued.**

b. Removing Ruptured Cartridge Case.

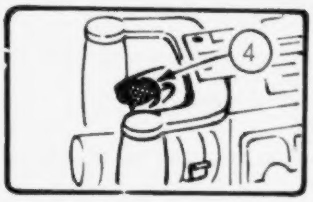
1. Raise cover and retract bolt.

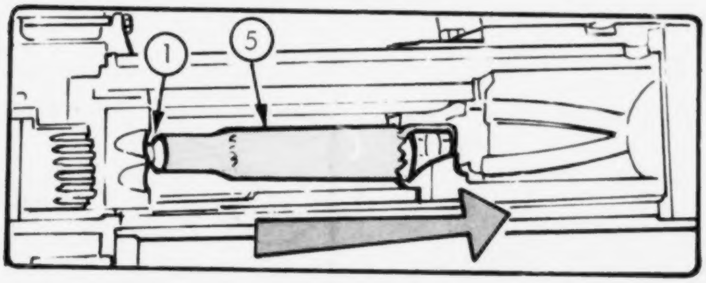


2. Place ruptured cartridge case extractor (1) in T-slot of bolt (2).

3. Hold extractor (1) in line with chamber with bolt extractor (3).

4. Depress release (4) to return bolt forward. Use slide handle to ease bolt into battery. DON'T DEPRESS TRIGGER.





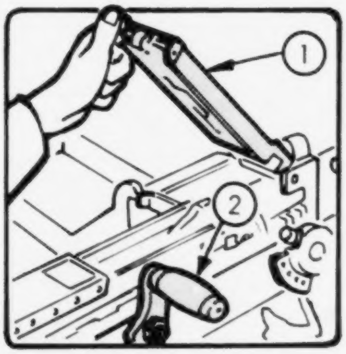
5. Retract bolt and remove ruptured cartridge case (5) and extractor (1).

## 3-22. Cal .50 Machine Gun - continued.

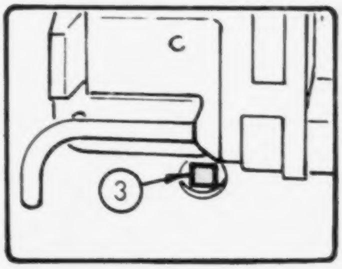
### c. Checking and Adjusting Headspace/Timing.

WARNING: Improper headspace can cause malfunctioning of machine gun and damage to gun . . . gunner too.

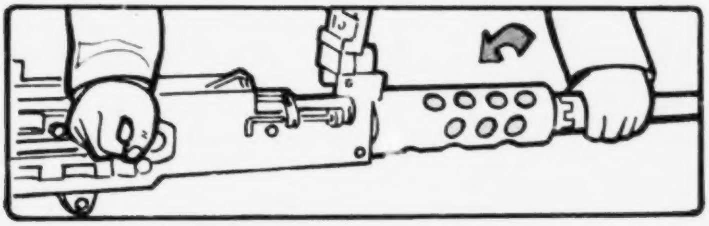
NOTE: You'll have to check and adjust headspace before firing . . . after assembling gun . . . and after replacing barrel or any group in the receiver.



1. Cock weapon. Raise cover (1).



2. With slide handle (2), retract bolt about 3/8-inch until locking lug (3) is centered in hole.

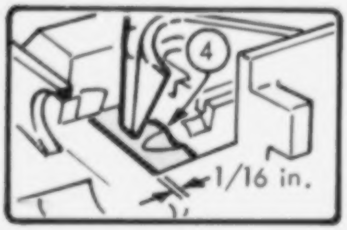


3. Hold bolt in this position (you can stick a cal .50 metal link between trunnion block and barrel extension or else keep holding handle) and screw barrel fully into barrel extension.

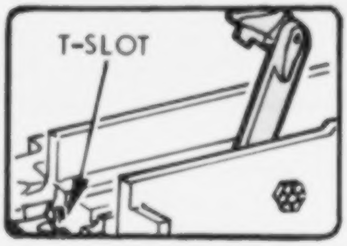
4. With bolt still retracted, unscrew barrel two notches (clicks). Release handle (or remove link, if you used one).

## 3-22. Cal .50 Machine Gun - continued.

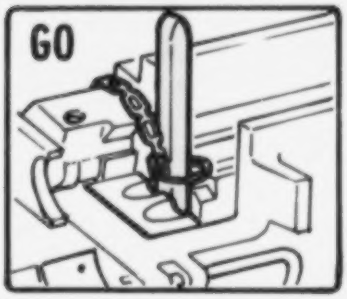
5. Cock machine gun, and holding handle, release bolt and slowly return bolt forward. Don't press trigger . . . and NO SLAMMING!

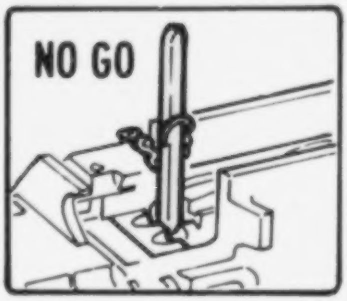


6. Retract recoiling parts far enough to separate barrel extension (4) from trunnion block by 1/16 inch.



7. Raise extractor out of the way and try both ends of GO/NO GO gage as shown below:



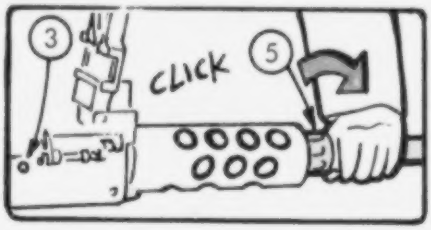


8. If GO end of gage enters T-slot to center ring of gage, and the NO GO end will not enter, headspace is correct.

9. Headspace Too Tight. If GO end or gage will not enter T-slot freely, continue as follows:

   (a) Retract bolt so you can see locking lug (3).

   (b) Unscrew barrel (5) one notch (click).

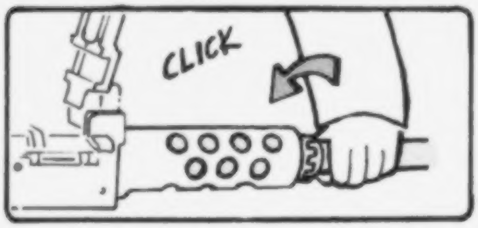


(c) Slowly return bolt forward; then retract recoiling parts 1/16-inch (step 6).

(d) Recheck headspace (step 8).

(e) Keep repeating steps (a) thru (d) until GO gage fits.

10. Headspace Too Loose. If NO GO end of gage enters T-slot, continue as follows: adjust headspace using same procedure as above (paragraph 3-22, c., steps 1. through 9., starting on page 3-99), except that you screw barrel into barrel extension.



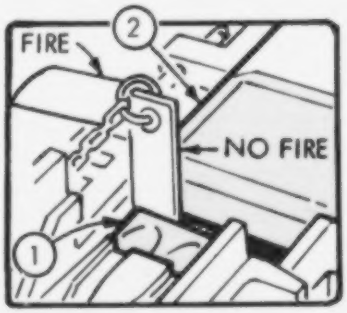
Keep repeating above steps, one clock at a time, until NO GO gage doesn't fit.

11. Checking Timing. Check timing as follows:

(a) Check headspace.

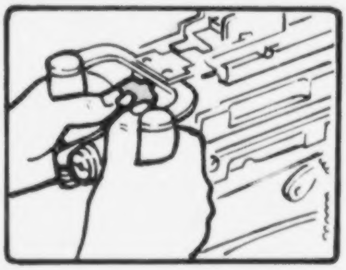
(b) Cock machine gun and raise cover. Raise extractor.

(c) Retract bolt just enough to insert NO FIRE gage between barrel extension (1) and trunnion block (2). Release slide handle slowly.

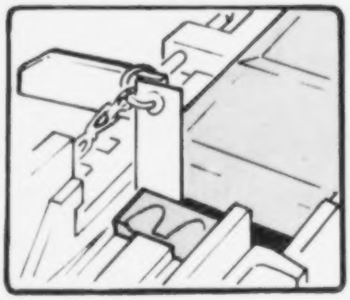


**WARNING: Before going to next step make certain gun is clear of ammo.**

(d) Press trigger; gun SHOULD NOT fire. If it does fire, you have early timing . . . go on to step 12 below.



(e) Retract bolt just enough to remove NO FIRE gage and insert FIRE gage between barrel extension and trunnion block. Release slide handle slowly.



(f) Press trigger; gun SHOULD FIRE. If it does not fire, you have late timing . . . go on to step 12 below.

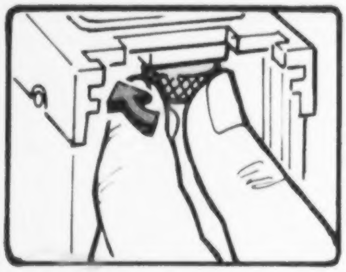
12. Adjusting Timing (Either Early or Late). Adjust timing as follows:

(a) Remove gage, cock gun, and return bolt forward as before.

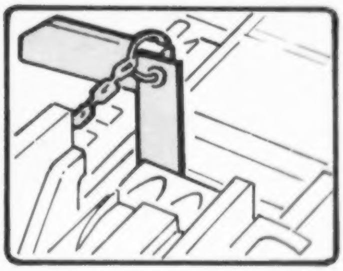
(b) Remove back plate, paragraph 3-22, a., steps 1 through 5, starting on page 3-93).

**WARNING: Never cock gun with back plate off, unless you remove driving spring rod first (step 6, page 3-94).**

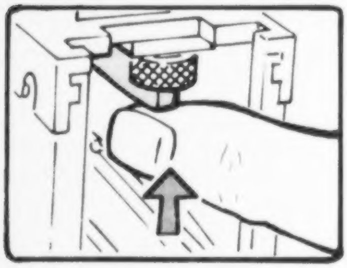
## 3-22. Cal .50 Machine Gun - continued.



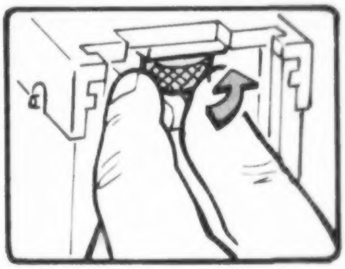
(c) Screw timing adjustment nut all the way down (to the left).



(d) Insert FIRE gage as before (step 11. (c), page 3-101.



(e) Try to fire gun by pushing up on rear of trigger bar. Gun SHOULD NOT fire.



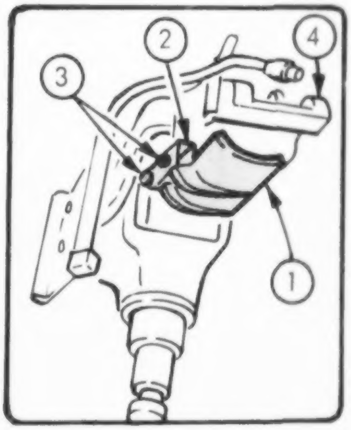
(f) Screw timing nut up one click at a time. Push up on trigger bar after each click. Keep doing this until gun fires.

(g) Now turn nut two more clicks up. NO MORE. Remove gage, replace back plate, and recheck timing.

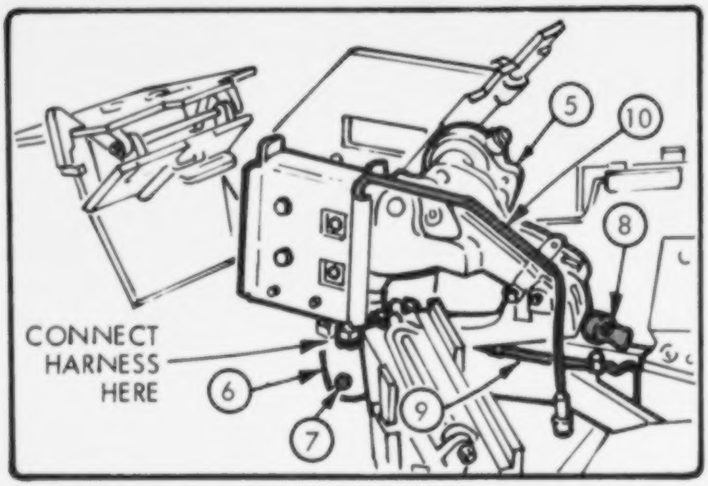
d. Installation/Removal of Cal .50 Machine Gun From Cupola.

**NOTE: Installation is shown. Reverse procedure for removal.**

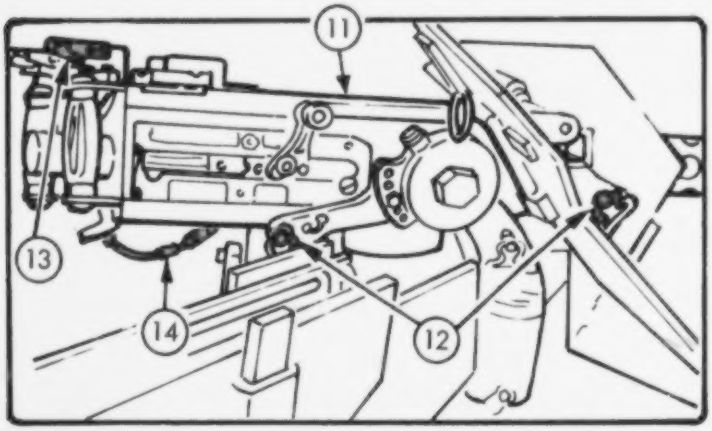
1. Install ejection chute (1) and clamp (2) with two bolts and washers (3) on cradle (4).



**3.22. Cal .50 Machine Gun - continued.**



2. Install cradle-pintle (5) in pintle support assembly (6). Secure with quick release pin (7) and travel lock lever (8). Connect support cable assembly (9) with cupola traverse switch wiring harness (10).

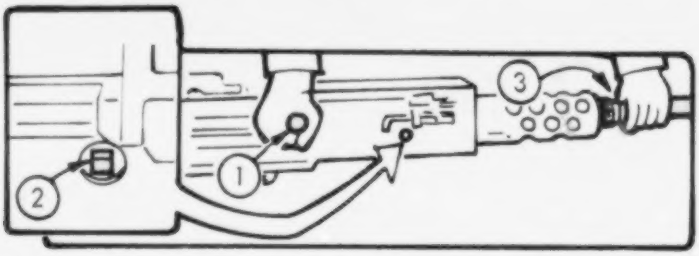


3. Install machine gun (11) and two locking pins (12).
4. Install cupola traverse switch assembly (13) with four screws.
5. Connect switch assembly quick disconnect (14) to wiring harness (10).

## 3-22. Cal .50 Machine Gun - continued.

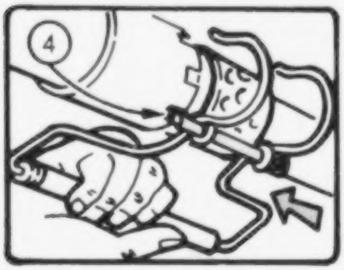
### e. Installation/Removal of Barrel, Carrier, Flash Hider.

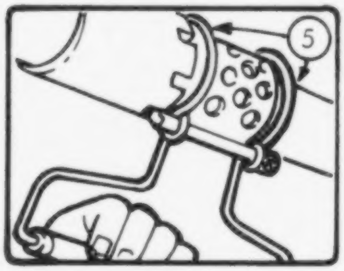
**NOTE: Installation is shown. Reverse for removal.**



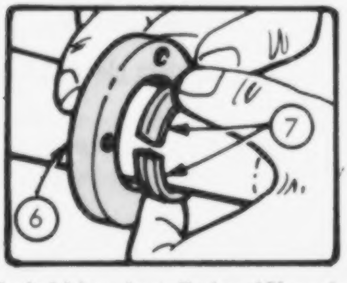
**WARNING: Hot barrel means use of asbestos gloves.**

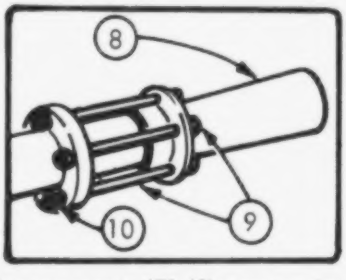
1. Install barrel by pulling slide handle (1) to rear until lug (2) on barrel locking spring is centered in hole. Screw barrel (3) into barrel extension.





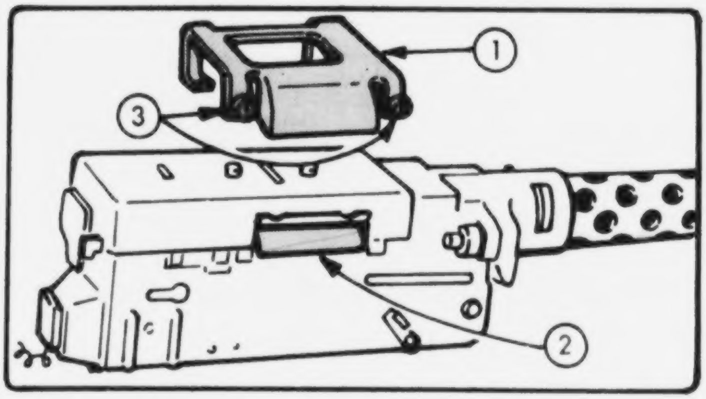
2. Install carrier by sliding end of bolt (4) into a groove at 5 or 7 o'clock position. Then hook clamps (5) into other grooves.



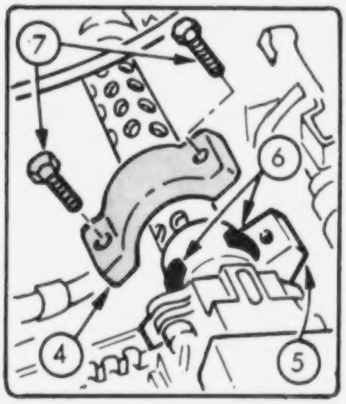


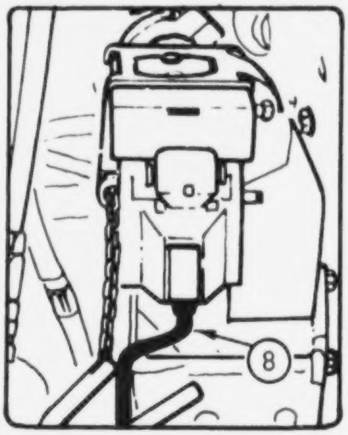
3. Flash hider: Install ring (6) and ring segments (7) (flanges go into ring). Install flash hider cone (8) with screws (9) and nuts (10).

a. Installing 7.62-mm Gun On Vehicle. Refer to TM9-1005-233-10.



1. Install spent link chute extension (1) on cover. Align extension over spent link opening (2) and tighten two screws (3).





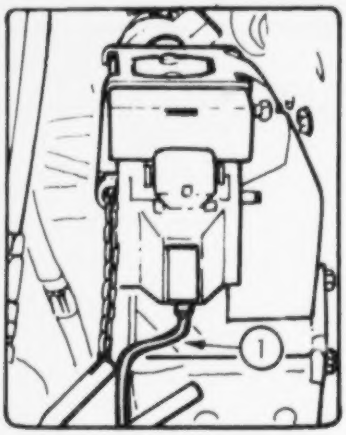
2. Remove mounting cap (4) from bracket (5). Place machine gun on bracket aligning gun keys (6) with bracket keyways. Install cap and two screws (7).

3. Connect electrical lead (8).

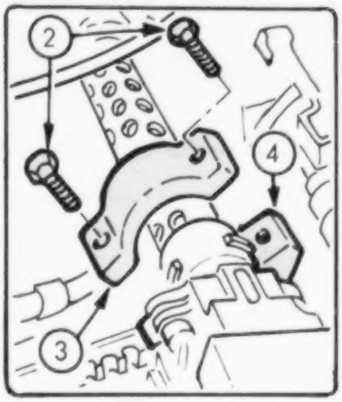
4. Make certain gun is not loaded. Turn master switch on. Turn fire control selector to CONV and machine gun safety to OFF. If you hear a click from gun solenoid before trigger is actuated, call support maintenance (to correct a possible electrical short).

## 3-23. 7.62-MM Machine Gun - continued.

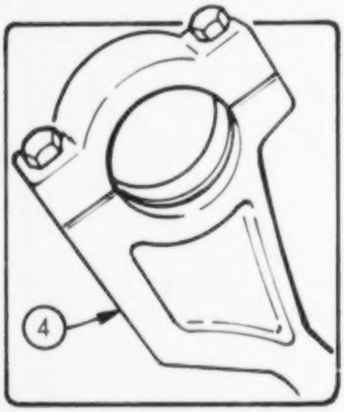
b. Removing Gun From Vehicle.



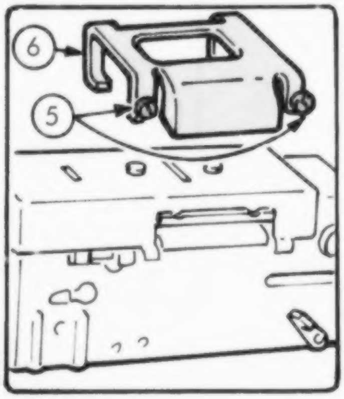
1. Disconnect electrical lead (1).



2. Remove two screws (2) and mount cap (3). Lift machine gun off bracket (4) and back it out.



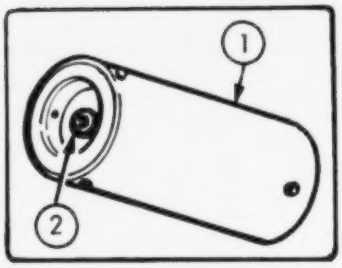
3. Place mount cap back on bracket (4) and install the two screws finger tight.



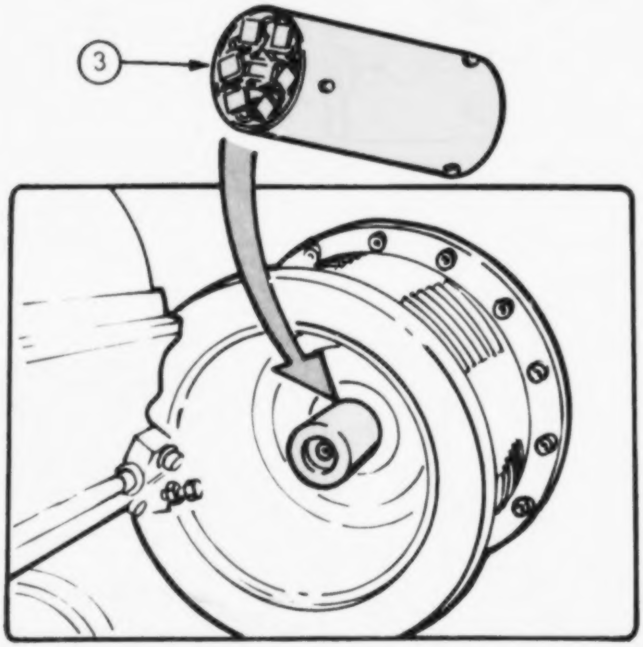
4. Loosen two screws (5) and remove spent link chute extension (6).

## 3-24. Gun/Launcher.

a. Checking Continuity of Firing Mechanism.



1. Turn on vehicle MASTER switch.
2. Cock actuator 4933-00-435-7736 (1) by pressing button (2).



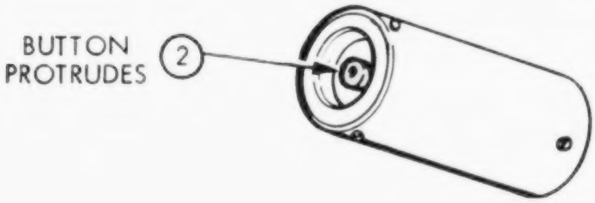
3. Open breech. If needed, clean dirt and oil from firing probe (of firing mechanism) and chamber. Firmly seat magnetized end (3) of actuator over firing probe. Manually close breech.
4. Place safe ready switch in ready position.

**WARNING: Make sure personnel are clear of outside of turret . . . and path of gun/launcher.**

**CAUTION: Don't use actuator on any power source other than those described below . . . it's designed only for these conditions.**

5. Turn on TURRET CONTROL switch. Turn FIRE CONTROL selector to MISSILE, and obtain a ready light.

6. Don't pull any of the triggers. Rotate handwheel one complete turn. Open the breech and check plunger. If button protrudes, call support maintenance. Repeat these steps with fire control selector in OFF, COAX and CONV positions.



7. With palm switch depressed, fire gun from gunner's or commander's control handle.

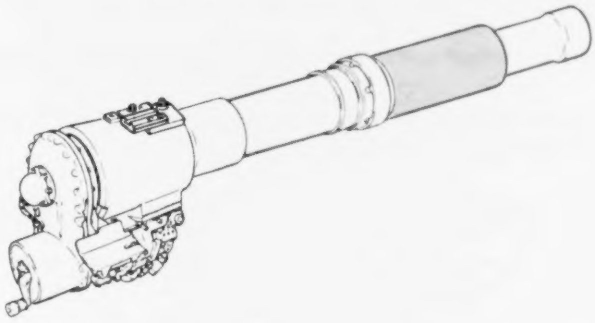
8. Open breech and check actuator. You've got continuity if actuator button (2) is tripped (popped out). If button isn't tripped, you'll need organizational maintenance.

9. Cock actuator and close breech by hand. Turn selector to CONV and repeat steps 7 and 8.

10. Cock actuator and close breech by hand. Fire from blasting machine and check continuity (step 8).

b. Removal/Installation Evacuator Cylinder of the M81 MOD Gun/Launcher.

If you have an M81 modified gun/launcher, you must clean the evacuator cylinder on the third day after firing or monthly if gun is not being fired.

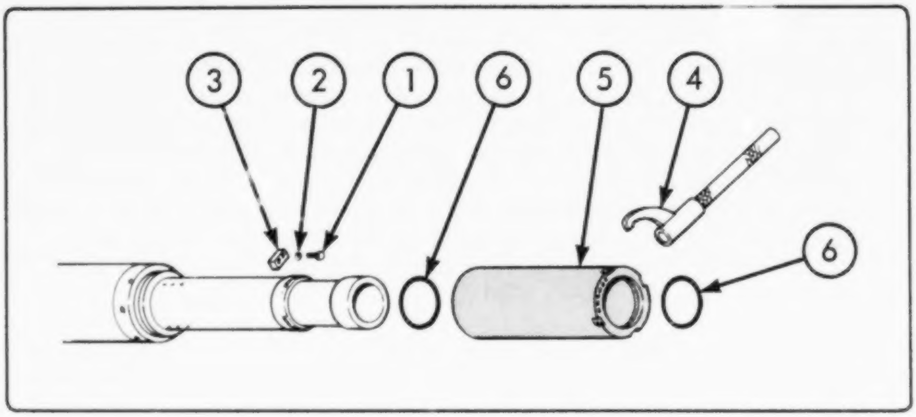


M81 MODIFIED GUN/LAUNCHER

1. Bring gun/launcher to zero degrees elevation.
2. Turn off cupola power switch.
3. Turn off turret power switch.
4. Turn off master battery switch.

**CAUTION: In removing and installing the evacuator, use extreme care not to damage threads and "O" rings. Keep evacuator parallel to gun tube at all times.**

### 3-24. Gun/Launcher - continued.



5. Remove two screws (1), two lockwashers (2), and block (3). Use spanner wrench (4) to start removal of evacuator (5), then complete removal by hand. Remove "O" rings (6) by hand. Place evacuator in protected area when removed from gun.

**NOTE: Damaged "O" rings to be replaced at organizational maintenance.**

**NOTE: Use your 20-inch long socket wrench handle (or equivalent) as handle for spanner wrench.**

6. Clean all powder contacting surfaces with RBC. Wipe dry and apply a thin coating of PL-S oil. Apply GAA grease to threaded portions of evacuator and thrust collar before assembling. Reference LO 9-2350-230-12 for full instructions on cleaning and lubricating your gun/launcher.

## 3-24. Gun/Launcher - continued.

c. Determining Remaining Life of Gun/Launcher.

You can fire all the missiles you want and it won't fatigue your gun/launcher . . . BUT, when you use conventional ammo it's a different story. When you fire conventional ammo the tremendous pressure buildup results in metal fatigue and stress on the tube . . . this eventually poops out your gun/launcher and you'll need a new one. Your direct support personnel may borescope your weapon. This will not determine the remaining life and, for this weapon, there is no pullover gage to tell you when your gun/launcher needs to be replaced. To tell when your gun/launcher needs to be replaced, READ ON!!

d. Equivalent Full Charge (EFC) Round. The EFC round lets you count down the life of the gun/launcher by the numbers. Used only for conventional ammo, you have two possibilities. See below:

| Each conventional round when: | EFC round |
|---|---|
| Outside temperature is below 105°F . . . . . . . . . . . . . . | 1 |
| Outside temperature is above 105°F . . . . . . . . . . . . . . | 2 |

e. Recording the EFC Round. For your own protection you'll have to keep an accurate record of the EFC rounds fired. After a firing mission, grab your EQUIPMENT LOG BOOK and fill out DA Form 2408-4 (Weapon Record Data). TM 38-750 tells you how. Do not lose your 2408 card.

f. Round Life of Gun/Launcher.

1. M81E1. After you have fired 800 rounds in your M81E1 gun/launcher, have it retubed and rechambered. After another 800 rounds, have the complete cannon pressure vessel (CPV) replaced.
2. M81 MODIFIED. After you have fired 600 rounds in your M81 MODIFIED gun/launcher, have it retubed and rechambered. After another 600 rounds, have the complete CPV replaced.

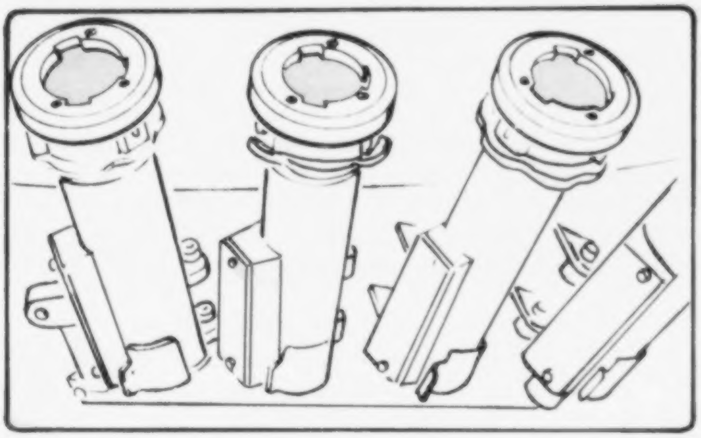
g. Sighting and Fire Control and Missile Subsystem. Maintenance data for the fire control and missile subsystem is provided in table 3-4.

## 3-24. Gun/Launcher - continued.

Table 3-4. Inspecting and Cleaning - Sighting and Fire Control and Missile Subsystem

| Component | Inspecting and cleaning |
|---|---|
| | SIGHTING AND FIRE CONTROL EQUIPMENT |
| | INSPECTING |
| Overall | Check that all components are free from grease, dirt, foreign matter, rust, corrosion, and excessive wear. |
| | CLEANING |
| Metal Parts | Use SD to remove grease or oil; dry thoroughly. Avoid rubber parts (e.g., eyepiece). Apply lubricating oil MIL-L-6085 to polished surfaces. |
| Rubber parts | Clean with soap and warm water. |
| | **CAUTION: Do not use polishing liquids, pastes, abrasives, or cleaning cloths for cleaning lenses.** |
| Optical surfaces | Brush lightly with clean artist's brush. To remove oil or grease below + 32°F, moisten lens tissue paper with alcohol and clean. When cleaning optical surfaces above + 32°F, use liquid lens cleaning compound and lens paper. |
| | MISSILE SUBSYSTEM UNITS |
| | INSPECTING |
| Overall | Check that all components are free from grease, dirt, foreign matter, rust, corrosion, and excessive wear. |
| | CLEANING |
| Metal parts | At regular intervals, wipe equipment with a clean cloth to remove dust, dirt, or grease; especially after operating in muddy, sandy, or dusty terrain. |
| Transmitter door | Lubricate hinge and actuating rod (LO 9-2350-230-12). |
| Transmitter lenses | Refer to cleaning Optical Surface above. |

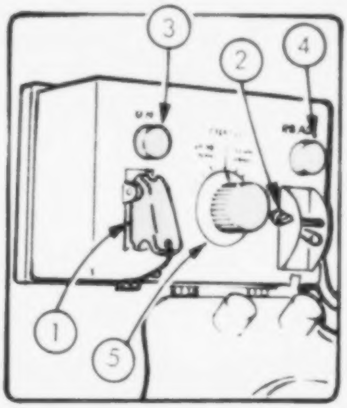
## 3-25. Electrical Continuity of Grenade Launcher.



**WARNING: Make certain all launcher tube assemblies are clear of grenade launchers.**

a. At commander's grenade launcher controls, remove safety seal from MASTER switch cover (1) and safety pin (2) from FIRE switch.

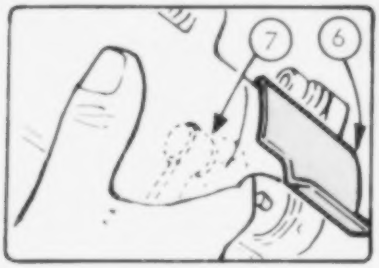
b. With vehicle MASTER switch on, push grenade launcher MASTER switch to on position. ON lamp (3) will light and, after a short warm-up, READY lamp (4) will come on.

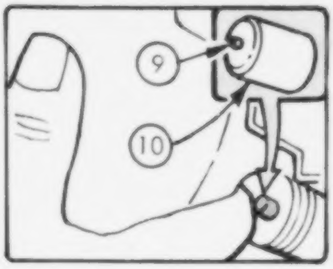


c. Turn rims of ON and READY lamps to adjust brightness.

d. Turn selector knob (5) to LEFT SALVO.

## 3-25. Electrical Continuity of Grenade Launcher - continued.



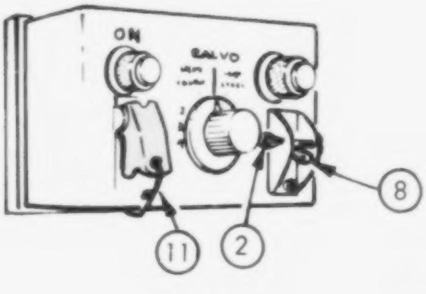


e. Outside, at one launcher tube on the left, have another man slide up inspection cover (6) and lift up on solenoid guard (7). Now, at commander's station, push up on FIRE switch (8); man outside checks firing pin (9) . . . pin should extend above pin seat (10). If it doesn't you'll need organizational maintenance.

f. Repeat step e at remaining three left tube assemblies and at all other positions at grenade launcher controls . . . that's RIGHT SALVO and SALVO (checking all eight solenoids at the eight individual positions).

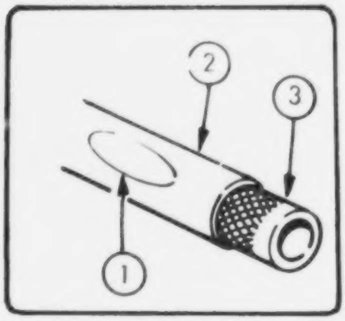
**NOTE: After each fire, wait about 4 seconds to let system recharge.**

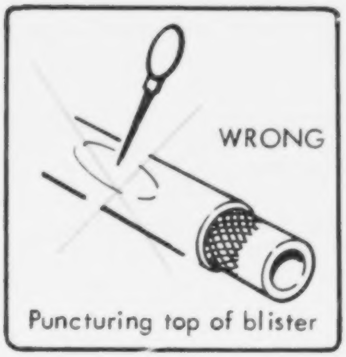
g. Turn MASTER switch off and secure cover with seal (11). Secure FIRE switch with safety pin (2).



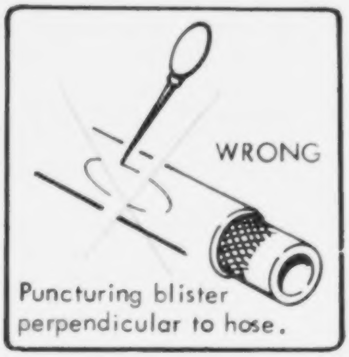
## 3-26. Deblistering CBSS Hose.

NOTE: A blister (1) develops when air gets trapped between the outer cover (2) and metal braided layers (3). Be sure to deblister correctly . . . the idea is to puncture only the outer layer without damage to inner layers.

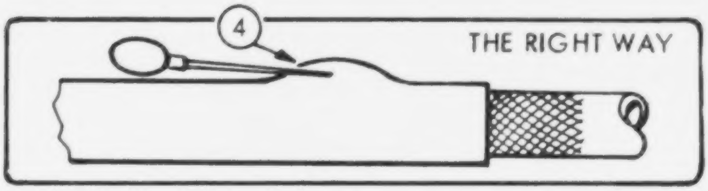




Puncturing top of blister



Puncturing blister perpendicular to hose.



a. Use an awl, large needle, or some other sharp-pointed tool.

b. With tool as near parallel to hose as possible, insert point (4) at base of blister. Rub out blister towards puncture.

## 3-27. Servicing Requirements for Organizational Maintenance.

Scheduled services performed by organizational maintenance at specific intervals are listed in table 3-5 below. Notify organizational maintenance when scheduled services become due - (check your equipment log book). Enter completion of scheduled services on appropriate logbook forms in accordance with TM 38-750.

Table 3-5. Equipment Inspection List

| Assembly or Component | Interval |
|---|---|
| Type II Detent | After each day's firing not to exceed 40 rounds between cleanings.<br>Upon completion of firing when additional firing is not anticipated.<br>Every 90 days when not firing. |

**NOTE: Those vehicles equipped with a type III detent do not require servicing unless there is smoke or fire leakage; then direct support maintenance is to be notified.**

| Assembly or Component | Interval |
|---|---|
| CBSS Check Valve | Not to exceed 100 rounds between cleanings (more frequently if there is carbon buildup or decrease in CBSS air volume).<br>Upon completion of firing when additional firing is not anticipated.<br>Every 90 days when not firing. |
| Firing Mechanism | Not to exceed 200 conventional rounds.<br>Every 90 days when not firing. |
| Compressor (CBSS)<br>Air Intake Filter/ Strainer<br>Oil Level<br>Operation | Weekly or after 400 rounds or 30 hours of compression operation. |
| Replace Cartridge | After 400 rounds or 30 hours of compression operation--more frequently under dusty conditions. |

Table 3-5. Equipment Inspection List - continued

| Assembly or Component | Interval |
|---|---|
| Drain and Refill with Oil | Quarterly or after 50 hours of compression operation--more frequently during extreme conditions; such as extremely high or low temperatures or prolonged operation periods. |
| Service Compressor | 1200 rounds or 100 compressor hours. |
| Beam Pattern Check | Semiannually |
| Cable Assembly ("U" Cord) | Quarterly |
| Electric Drive and Main Weapons System Tests (tests performed with Fault Isolation Test Set) | Quarterly |

### 3-28. Gas-Particulate Filter Unit.

a. General. The vehicle operator is responsible for maintaining the filter unit to ensure that it works at all times.

b. Operational Services. Refer to the Preventive Maintenance checks and services, table 3-1, for all before operation services. These checks will be done each day the vehicle is used.

c. Gas and Particulate Filter Serviceability. For your maximum safety it is vital that the gas and particulate filters of the gas-particulate filter unit be fully serviceable.

1. Table 3-6 (next page) gives the conditions that require replacement of these filters. The vehicle operator is responsible for notifying organizational maintenance when one or more of these conditions exist.

**WARNING: Contaminated filters must be handled using adequate precautions (FM 21-40) and must be disposed of by trained personnel.**

2. Organizational maintenance is responsible for changing filters when notified.

d. Spring Clip Replacement.

1. Missing or damaged.
2. Rubber gasket missing or does not seal properly.

**3-28. Gas-Particulate Filter Unit - continued.**

e. Air Flow Control Cap Replacement.

1. Missing or damaged.
2. Cracked.

**NOTE: Install new cap by disconnecting air hose and stretching center ring of device over the manifold port.**

f. Air Purifier.

1. Wipe the air purifier with a cloth moistened with a dry-cleaning solvent and slide the spring clip over the air intake holes when finished operating the unit.
2. Check it for damaged or missing parts.
3. Install solid caps on all purifier manifold outlet pocket not connected to a hose.

Table 3-6. Replacement of M12A1 Gas and M13 Particulate Filters in the M8A3

**NOTE: You'll need organizational maintenance for replacement of the filters when any of these conditions exist.**

| Condition for Filter Replacement |
|---|

a. Gas Filter Change Criteria: Change M12A1 Gas Filter when any one of the following conditions exist.

1. Physical damage.
2. Water immersion.
3. Low airflow to the mask (see troubleshooting table 3-2) (page 3-58)
4. 5,000 mile vehicle overhaul (peacetime).
5. 10,000 hours of vehicle operation (wartime-no chemical agent operations.
6. 1,500 hours of vehicle operation (approx 5 mo) wartime-chemical agent operations.

Table 3-6. Replacement of M12A1 Gas and M13 Particulate Filters in the M8A13 - continued

Condition for Filter Replacement

7. At beginning of combat conditions and the use of AC (Hydrogen Cyanide) or CK (Cyanogen Chloride) is expected.

8. As soon as possible, after each AC or CK attack.

b. Particulate Filter Change Criteria: Change the M13 particulate filter whenever any of the following exist.

1. Physical damage.

2. The gas filter is changed.

3. The particulate filter becomes clogged, resulting in insufficient airflow to each crew member station.

# APPENDIX A
# REFERENCES

The publications listed below are references in this manual and contain information pertinent to the M551 vehicle and its associated equipment.

| | |
|---|---|
| Lubrication Order for M551 | LO 9-2350-230-12 |
| Operator's and Organizational Maintenance Manual for Radio Sets AN/VRC-12, -43, -44, -45, -46, -47, -48, -49, -54 and -55 | TM 11-5820-401-12 |
| Operator's and Organizational Maintenance Manual for Radio Sets AN/VRC-53 and -64; AN/GRC-125 and -160 | TM 11-5820-498-12 |
| Operation and Maintenance Manual of Ordnance Materiel in Cold Weather (0° to -65°) | TM 9-207 |
| The Army Maintenance Management Systems (TAMMS) | TM 38-750 |
| Night Vision Sight AN/PVS-2 | TM 11-5855-203-10 |
| Night Vision Sight AN/TVS-2 | TM 11-5855-202-13 |
| Searchlight, Infrared AN/VSS-3 | TM 11-5855-217-12 |
| Searchlight, Infrared AN/VSS-3A | TM 11-5855-217-12-1 |
| Operator's Manual: Machine Gun, Cal .50, M2 | TM 9-1005-213-10 |
| Care, Handling, Preservation, and Destruction of Ammunition | TM 9-1300-206 |
| Operator's Manual: M73, M73A1, and M219 Machine Guns | TM 9-1005-233-10 |
| Operator's Manual, Mask, C-B: Tank M25/25A1 and Accessories | TM 3-4210-280-10 |
| Equipment Serviceability Criteria for AR/AAV M551/M551A1 | TM 9-2350-230 ESC |
| NBC (Nuclear, Biological and Chemical) Defense | FM 21-40 |

# APPENDIX B
# BASIC ISSUE ITEMS LIST (BIIL)

## Section I. INTRODUCTION

### B-1. Scope

This appendix lists basic issue items which are needed to operate and maintain the AR/AAV M551/M551A1.

### B-2. General

Basic Issue Items List. A list, in alphabetical sequence, of items which are furnished with and which must be turned in with the end item upon transfer between numbered accounts.

### B-3. Explanation of Columns

1. Column 1 - Item Number. Shows the number that identifies the illustration of the item.
2. Column 2 - National Stock Number (NSN). Shows the number that is used to requisition the item.
3. Column 3 - Description. A short description to identify the item.
4. Column 4 - Quantity Furnished With Equipment. The quantity of each item supplied with each AR/AAV M551/M551A1.

## Section II. BASIC ISSUE ITEMS

| (1)<br>ITEM NO. | (2)<br>NATIONAL STOCK NO. | (3)<br>DESCRIPTION CREW USAGE | (4)<br>QTY FURN WITH EQUIP |
|---|---|---|---|
| 1 | 4933-00-435-7736 | ACTUATOR, ELECTROCHEMICAL, LINEAR: Firing Pulse<br>To test firing circuit prior to use | 1 |
| 2 | 4930-00-288-1511 | ADAPTER, GREASE GUN: Hyd., 12 Inches Long<br>Use with grease gun to adjust track and lubricate vehicle | 1 |
| 3 | 5110-00-293-2336 | AXE, SINGLE BIT: 4 Pounds<br>Dislodge debris from suspension - cut trees or timber in emergency | 1 |
| 4 | 2540-00-670-2459 | BAG ASSEMBLY, PAMPHLET:<br>To stow crew publications packed and issued with vehicle | 1 |
| 5 | 5140-00-473-6256 | BAG, TOOL, SATCHEL:<br>For stowage of hand tools on vehicle | 1 |
| 6 | 1005-00-113-9657 | BAG, EMPTY CARTRIDGE:<br>Collection bag attached to 7.62-mm machine gun collection frame | 1 |
| 7 | 6135-00-120-1010 | BATTERY, DRY: 1.5 Volt, C-size, Type BA42 (SIGHT/FIRE CONTROL)<br>For infrared sights as emergency power | 2 |
| 8 | 7510-00-889-3494 | BINDER, LOOSE-LEAF, EQUIPMENT LOG BOOK: (In Pamphlet Bag)<br>To stow log book forms and ESC | 1 |
| 9 | 1240-00-950-1605 | BORESIGHT AID ASSEMBLY: 44 Series Periscope<br>Boresight periscope with gun | 1 |
| 10 | 4933-00-852-6310 | BORESIGHT ASSEMBLY: 152-mm<br>Boresight prior to firing | 1 |
| 11 | 2540-00-808-6858 | BOX ASSEMBLY: Spare Lamp<br>To stow spare bulbs as used in sights, instruments and interior lights | 1 |
| 12 | 1025-00-189-5762 | BRUSH ASSEMBLY, BORE: 152-mm<br>Clean tube after firing | 1 |

| (1)<br>ITEM NO. | (2)<br>NATIONAL STOCK NO. | (3)<br>DESCRIPTION CREW USAGE | (4)<br>QTY FURN WITH EQUIP |
|---|---|---|---|
| 13 | 7240-00-089-3827 | CAN, WATER, MILITARY: Plastic 5 Gallon<br>Replenishing coolant in radiator; also personnel water | 1 |
| 14 | 5140-00-261-4994 | CARRIER, TOOL: Wire Cutter<br>To protect wire cutter when not in use | 1 |
| 15 | 8140-00-421-3954 | COVER ASSEMBLY: Ammo, Protective<br>Safety protection for ammo | 24 |
| 16 | 1025-00-435-7733 | COVER, Bore Brush: 152-MM<br>Protect bore brush when stowed | 1 |
| 17 | 1025-00-116-0591 | COVER, PROTECTIVE: Cal .50 Machine Gun<br>Protect cal .50 machine gun when not in use | 1 |
| 18 | 1005-00-796-4436 | COVER; SPARE BARREL: Cal .50 Machine Gun<br>Protect spare barrel when stowed | 1 |
| 19 | 5120-00-224-1390 | CROWBAR: Pinch Point<br>To check for broken torsion bars, also to check suspension | 1 |
| 20 | 5110-00-595-8229 | CUTTER: Wire Rope, Hand Operated<br>To cut bands on palletized ammo, and to cut wire entangled in suspension | 1 |
| 21 | 5120-00-678-2795 | DRIFT PIN: Track<br>Required for removal of track pin | 1 |
| 22 |  | EQUIPMENT LOGBOOK: (Includes Forms Specified in TM 38-750)<br>To record vehicle usage and maintenance |  |
| 23 | Deleted |  | 1 |

| (1)<br>ITEM NO. | (2)<br>NATIONAL STOCK NO. | (3)<br>DESCRIPTION<br>CREW USAGE | (4)<br>QTY FURN WITH EQUIP |
|---|---|---|---|
| 24 | 4933-00-146-0809 | EXTRACTOR ASSEMBLY: Conventional Round<br>To extract conventional round from chamber | 1 |
| 25 | 5120-00-243-7326 | EXTENSION, SOCKET WRENCH: 1/2-Inch Square Drive, 5 Inches Long<br>To assist in removal of road wheels | 1 |
| 26 | 5120-00-240-8705 | EXTENSION, SOCKET WRENCH: 1/2-Inch Square Drive, 20 Inches Long<br>To remove air compressor cover to facilitate cleaning | 1 |
| 27 | 4210-00-555-8837 | EXTINGUISHER, FIRE, MONOBROMO-TRIFLURO-METHANE: With Bracket, Hand Type<br>For safety when refueling vehicle. | 1 |
| 28 | 4910-00-906-1053 | FIXTURE, TRACK: Connecting<br>Connect and disconnect track | 1 |
|  | 8345-00-375-0223 | FLAG SET: M 238 (Consists of Items 29, 30, 31, 32 and 33)<br>Signal devices during training and maneuvers | 1 |
| 29 | 8345-00-178-8437 | CASE, CARRYING: M 238<br>To protect flag set | 1 |
| 30 | 8345-00-227-1406 | FLAG, GREEN: MC 275<br>Signal devices during training and maneuvers | 1 |
| 31 | 8345-00-227-1511 | FLAG, RED: MC 273<br>Signal devices during training and maneuvers | 1 |
| 32 | 8345-00-227-1405 | FLAG, YELLOW: MC 274<br>Signal devices during training and maneuvers | 1 |
| 33 | 8345-00-242-3650 | FLAGSTAFF: MC 270<br>Signal devices during training and maneuvers | 3 |
| 34 | 6230-00-264-8261 | FLASHLIGHT: MX991/U, 6Z-400-991<br>Used for signalling and ground-guiding of vehicle at night | 2 |
| 35 | 1005-00-716-2072 | FLASH HIDER: Cal .50 Machine Gun<br>Used to hide muzzle flash when firing. | 1 |

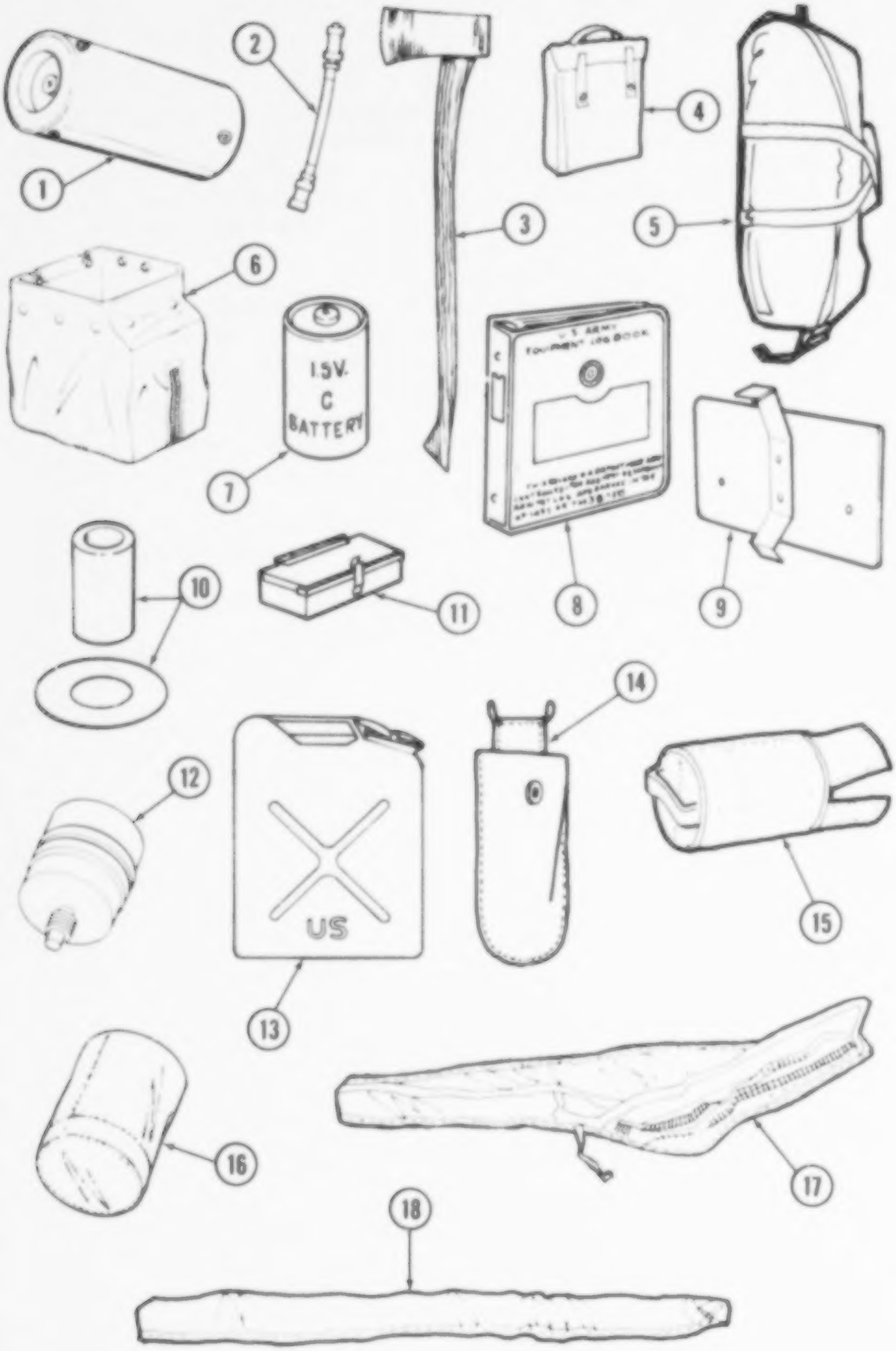
| (1)<br>ITEM NO. | (2)<br>NATIONAL STOCK NO. | (3)<br>DESCRIPTION<br>CREW USAGE | (4)<br>QTY FURN WITH EQUIP |
|---|---|---|---|
| 36 | 7240-00-404-9795 | FUNNEL: 2 Quart<br>To aid in adding oil to engine and transmission | 1 |
| 37 | 5120-00-061-8546 | HAMMER, HAND: Machinist's; Ball Peen, 2 Pounds<br>To drive drift pin when disconnecting track; miscellaneous use | 1 |
| 38 | 5120-00-288-6574 | HANDLE: Mattock Pick<br>Field expedients during mission | 1 |
| 39 | 5120-00-230-6385 | HANDLE, SOCKET WRENCH: Ratchet, 1/2-inch Square Drive, 9-1/2 Inches Long<br>For use with sockets | 1 |
| 40 | 5120-00-236 7590 | HANDLE, SOCKET WRENCH: Hinged, 1/2 inch Square Drive, 18 Inches Long<br>To provide handle for sockets to tighten and loosen bolts and nuts | 1 |
| 41 | 6545-00-922-1200 | KIT: First Aid<br>Required for emergency medical aid | 1 |
| 42 | 5120-00-240-5292 | KEY, SOCKET HEAD SCREW: 1/8 Inch Hexagon, 3-27/32 Inches Long<br>To tighten knob setscrews on dome lights | 1 |
| 43 | 5120-00-198-5410 | KEY, SOCKET HEAD SCREW: 3/16 Inch Hexagon, 5-19/32 Inches Long<br>To tighten screws in breech opening mechanism | 1 |
| 44 | 5120-00-198-5409 | KEY, SOCKET HEAD SCREW: 5/16-Inch Hexagon 6-3/32 Inches Long<br>To tighten M44 periscope mount | 1 |
| 45 | 6240-00-921-4493 | LAMP, INCANDESCENT:<br>To replace lamp that illuminates reticle in M119 or M127 telescope | 1 |
| 46 | 6240-00-817-9803 | LAMP INCANDESCENT:<br>To replace lamp that illuminates reticle in XM44 periscope | 1 |
| 47 | 4930-00-253-2478 | LUBRICATING GUN: Hand<br>To adjust track tension when loose, also to lubricate vehicle | 1 |

| (1)<br>ITEM NO. | (2)<br>NATIONAL STOCK NO. | (3)<br>DESCRIPTION<br>CREW USAGE | (4)<br>QTY FURN WITH EQUIP |
|---|---|---|---|
| 48 | | LUBRICATION ORDER: (LO 9-2350-230-12)<br>Lube instructions for crew | 1 |
| 49 | | MANUAL, OPERATOR AND ORGANIZATIONAL MAINTENANCE: (TM 9-2350-230-10)<br>Operator/crew information | 1 |
| 50 | 5120-00-243-2395 | MATTOCK: Pick, Without Handle, 5 Pounds<br>Field expedients during mission | 1 |
| 51 | 1005-00-704-6650 | MOUNT, MACHINE GUN: Cal .50<br>Mount for cal. 50 machine gun | 1 |
| 52 | 4930-00-169-8275 | OILER, HAND, PUMP TYPE: 8-Inch Spout<br>To lubricate in accordance with LO | 1 |
| 53 | 5340-00-912-4086 | PADLOCK SET: 1-3/4 Inch, with Clevis, with Two Keys<br>To secure vehicle interior from unauthorized entrance | 1 |
| 54 | 6640-00-597-6745 | PAPER, LENS: 50 Sheets<br>Cleaning lens of sights | 1 |
| 55 | 9905-00-624-3415 | PLATE, INSTRUCTION: (Range Card)<br>Firing during reduced visibility | 1 |
| 56 | 5120-00-223-7397 | PLIERS, SLIP JOINT: With Cutter, 8-Inches Long<br>To install and remove tow hook and pintle pin | 1 |
| 57 | 1025-00-918-8129 | PLUG, MUZZLE: For 152-MM Gun/Launcher<br>To prevent foreign matter from entering gun tube when not in use | 1 |
| 58 | 5340-00-792-9974 | PLUG, PROTECTIVE: Telescope Opening in Protective Shield<br>Protective plug when not being used | 1 |
| 59 | 1025-00-918-8130 | RAMMER, ARTILLERY: Cleaning and Unloading 152-MM<br>Unloading conventional stuck round | 1 |
| 60 | 5120-00-234-8913 | SCREWDRIVER, CROSS TIP: Number 2<br>Tighten water barrier screws | 1 |
| 61 | 5120-00-278-1283 | SCREWDRIVER, FLAT TIP: 6-Inches Long<br>Removal of dome light lamp access doors | 1 |

| (1)<br>ITEM NO. | (2)<br>NATIONAL STOCK NO. | (3)<br>DESCRIPTION<br>CREW USAGE | (4)<br>QTY FURN WITH EQUIP |
|---|---|---|---|
| 62 | 5120-00-809-1570 | SCREWDRIVER, FLAT TIP: 21-5/8 Inches Long Overall<br>Used to adjust tracker alinement | 1 |
| 63 | 5120-00-287-2130 | SCREWDRIVER, OFFSET: 4-1/2 Inches Long<br>Assist in removing and replacing obturator seal | 1 |
| 64 | 4030-00-914-4705 | SHACKLE, TOWING: With Pins and Locks<br>For towing and extracting vehicle during emergency, to attach tow cable | 4 |
| 65 | 5120-00-293-3336 | SHOVEL, HAND: General Purpose, D-Handle<br>Field expedients during mission | 1 |
| 66 | 5130-00-714-0593 | SOCKET, SOCKET WRENCH: 1/2-Inch Square Drive, 6 Point, 7/16-Inch Opening<br>Deep socket, 6 point, required for turret bearing lube plugs and lube fittings | 1 |
| 66 | 5120-00-237-0984 | SOCKET, SOCKET WRENCH: 1/2-Inch Square Drive, 12 Point, 1/2-Inch Opening<br>To tighten nuts and bolts on water barrier | 1 |
| 66 | 5120-00-189-7932 | SOCKET, SOCKET WRENCH: 1/2-Inch Square Drive, 12 Point, 9/16-Inch Opening<br>To tighten water barrier nuts and bolts | 1 |
| 66 | 5120-00-189-7946 | SOCKET, SOCKET WRENCH: 1/2-Inch Square Drive, 12 Point, 5/8-Inch Opening<br>To remove engine access plugs | 1 |
| 66 | 5120-00-235-5870 | SOCKET, SOCKET WRENCH: 1/2-Inch Square Drive, 12 Point, 11/16-Inch Opening<br>To remove and install track pin nuts | 1 |
| 66 | 5120-00-189-7985 | SOCKET, SOCKET WRENCH: 1/2-Inch Square Drive, 12 Point, 3/4-Inch Opening<br>To remove bolt and separate roadwheel | 1 |

| (1)<br>ITEM NO. | (2)<br>NATIONAL STOCK NO. | (3)<br>DESCRIPTION<br>CREW USAGE | (4)<br>QTY FURN WITH EQUIP |
|---|---|---|---|
| 66 | 5120-00-189-7934 | SOCKET, SOCKET WRENCH: 1/2-Inch Square Drive, 12 Point, 7/8-Inch Opening<br>To tighten roadwheel nuts | 1 |
| 66 | 5120-00-189-7935 | SOCKET, SOCKET WRENCH: 1/2-Inch Square Drive, 12 Point, 15/16-Inch Opening<br>To tighten traversing mechanism | 1 |
| 66 | 5120-00-189-7914 | SOCKET, SOCKET WRENCH: 1/2-Inch Square Drive, 12 Point, 1-1/8-Inch Opening<br>For turning track fixture adjusting bolt and miscellaneous tightening | 1 |
| 67 | 1090-00-563-7232 | STAFF SECTION: Cleaning, Artillery, M15<br>Used with bore brush and also rammer | 3 |
| 68 | 8340-00-841-6456 | TARPAULIN: Nylon, 12 x 17 feet<br>Used when loading ammo in field. Also used as shelter protection to cover vehicle when not in use | 1 |
| 69 | 4010-00-767-3149 | WIRE ROPE ASSEMBLY: Single Leg, Towing, Steel<br>Towing and extracting disabled vehicles | 1 |
| 70 | Deleted | | |
| 71 | 5120-00-228-9508 | WRENCH, COMBINATION: Open and Box 5/8 Inch<br>To hold roadwheel mounting bolt | 1 |
| 71 | 5120-00-228-9504 | WRENCH, COMBINATION: Open and Box, 3/8 Inch<br>To remove and install battery mounting bolts | 1 |
| 71 | 5120-00-228-9506 | WRENCH, COMBINATION: Open and Box, 1/2-Inch<br>To tighten battery cables | 1 |
| 72 | 5120-00-187-7131 | WRENCH, OPEN END: Fixed, Double Head, 7/8-Inch and 15/16-Inch Opening<br>To tighten traversing mechanism mount bolts | 1 |

| (1)<br>ITEM NO. | (2)<br>NATIONAL STOCK NO. | (3)<br>DESCRIPTION<br>CREW USAGE | (4)<br>QTY FURN WITH EQUIP |
|---|---|---|---|
| 72 | 5120-00-187-7133 | WRENCH, OPEN END: Fixed, Double Head, 1-Inch and 1-1/8 Inch Opening<br>To drain engine ventilation collector box | 1 |
| 72 | 5120-00-224-3102 | WRENCH, OPEN END: Fixed, Double Head, 5/8-Inch and 3/4-Inch Opening<br>To hold nut when removing roadwheel mounting bolt | 1 |
| 72 | 5120-00-277-2342 | WRENCH, OPEN END: Fixed, Double Head, 3/8-Inch and 7/16-Inch Opening<br>To remove and install battery mounting bolts | 1 |
| 72 | 5120-00-187-7124 | WRENCH, OPEN END: Fixed Double Head, 1/2-Inch and 9/16-Inch Opening<br>To tighten battery cables | 1 |
| 73 | 5120-00-930-1843 | WRENCH: Spanner (M81 Tube Only)<br>To remove bore evacuator for cleaning | 1 |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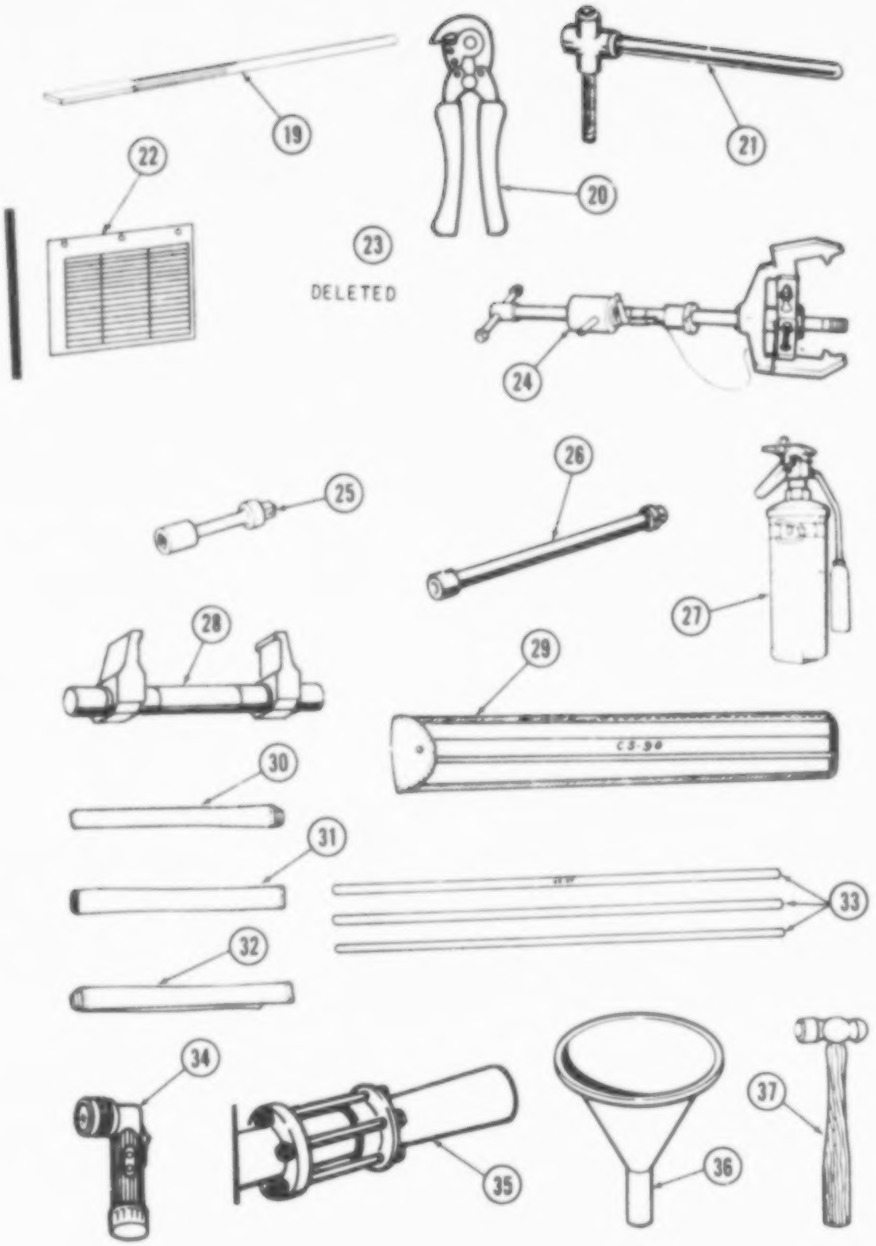
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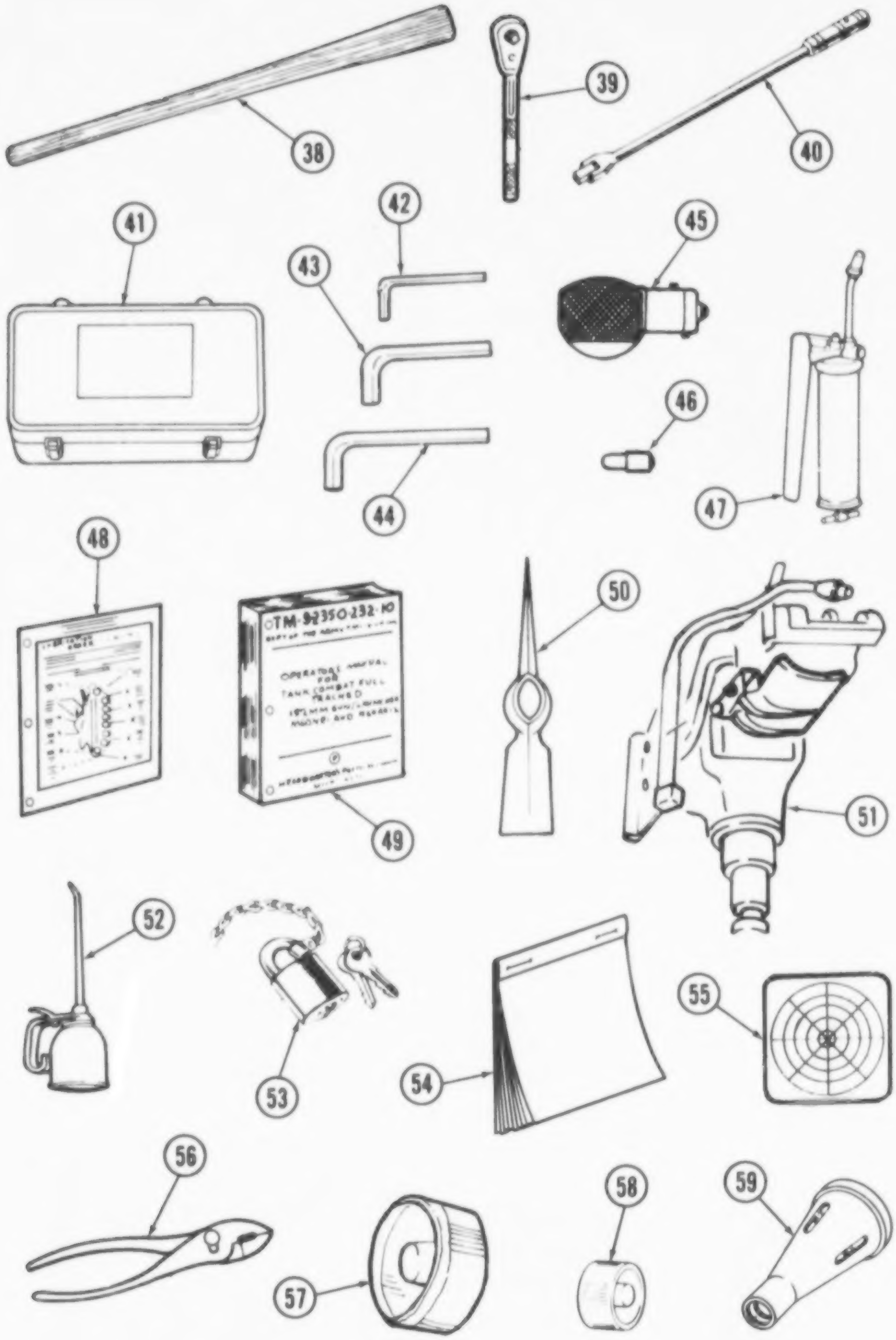
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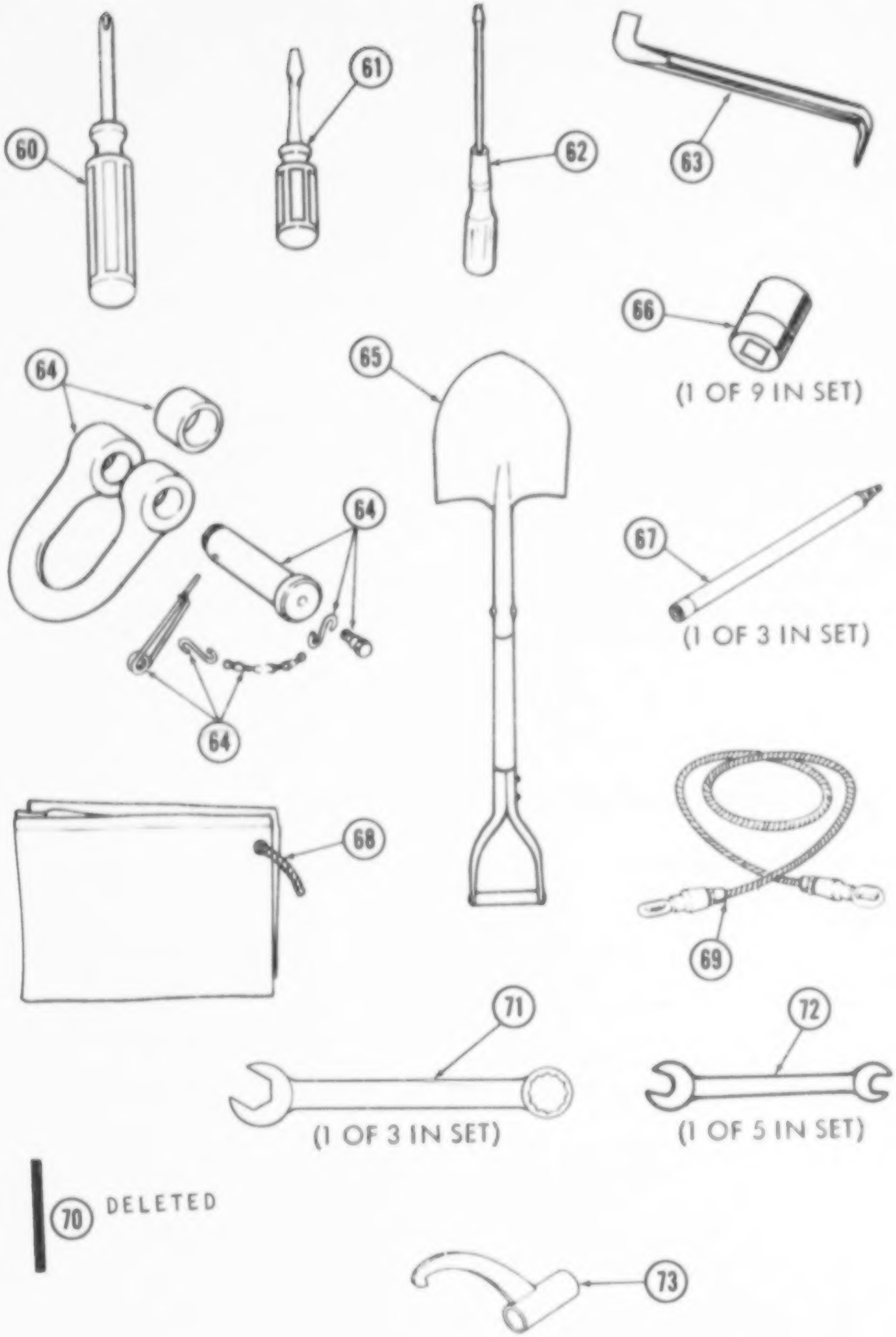
OPERATORS MANUAL FOR TANK COMBAT FULL TRACKED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(1 OF 5 IN SET)
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# APPENDIX C
# INTEGRAL COMPONENTS OF END ITEM (ICEI)

## Section I. INTRODUCTION

C-1. Scope

This appendix lists items considered as part of the AR/AAV M551/M551A1.

C-2. General

Integral Components of End Items. A list of parts, subassemblies, and assemblies that are connected, coupled, linked, affixed, mounted, or permanently combined with other integral components in manufacturer, maintenance, or overhaul to form the end item which will accomplish a specific function. Such items normally will not be required to be installed by the using unit. Integral components that are removed for transportation are also included in the catalogued description of the end item. Items contained on this list are included as a part of the end item and while they are not support items are listed for information purposes. All such items will be turned in with the end item upon transfer between accountable officers.

## Section II. INTEGRAL COMPONENTS OF END ITEM

| NATIONAL STOCK NO. | DESCRIPTION CREW USAGE | QTY FURN WITH EQUIP |
|---|---|---|
| 5306-00-051-4078 | BOLT: Machine<br>To attach spent brass ejection chute | 2 |
| 1025-00-018-8508 | BRACKET, MOUNTING COLLECTION: 7.62-mm MG<br>To mount 7.62-mm MG spent brass bag | 1 |
| 1005-00-853-7570 | CHUTE ASSY: Cartridge 7.62-mm MG<br>Spent cartridge chute 7.62-mm | 1 |
| 1005-00-844-3488 | CHUTE, EJECTION: Spent Brass<br>Spent brass ejection chute .50 cal | 1 |

| NATIONAL STOCK NO. | DESCRIPTION CREW USAGE | QTY FURN WITH EQUIP |
|---|---|---|
| 1025-00-844-3560 | CLAMP, EJECTION CHUTE: Spent Brass .50 Cal MG<br>To secure ejection chute .50 cal | 1 |
| 1025-00-134-3051 | EXTENSION, CHUTE: 7.62-mm MG<br>Chute Extension 7.62-mm | 1 |
| 1025-00-113-9659 | FRAME, COLLECTION BAG: 7.62-mm MG<br>To hold spent cartridge bag | 1 |
| 1290-00-901-8667 | INDICATOR, AZIMUTH:<br>This item is part of vehicle configuration | 1 |
| 1240-00-762-9334 | MOUNT, TELESCOPE:<br>For mounting telescope M127 | 1 |
| 6650-00-856-9455 | PERISCOPE: M37 (Loader)<br>Used by loader during mission | 1 |
| 1240-00-788-5464 | PERISCOPE, TANK: M47 (Driver)<br>Used by driver when buttoned up during daylight | 3 |
| 1240-00-762-9336 | PERISCOPE: M48 I.R. (Driver)<br>Used by driver during night mission | 1 |
| 1240-00-933-5630 | PERISCOPE, TANK: M44E1<br>Gunners sight for firing<br>OR | 1 |
| 1240-00-176-1031 | PERISCOPE, TANK: M44E2<br>Gunners sight for firing<br>OR | 1 |
| 1240-00-169-0912 | PERISCOPE, TANK: M44E3<br>OR | 1 |
| 1240-00-184-9897 | PERISCOPE, TANK: M44E4 | 1 |
| 1290-00-078-5568 | QUADRANT, M13A1C: Elevation<br>Used by gunner for indirect fire | 1 |
| 1025-00-003-0103 | SWITCH ASSY: Cmdr's Control Cal .50 MG<br>Commander's control mounted to cal .50 MG | 1 |
| 1240-00-437-1254 | TELESCOPE, ARTICULATED: M127<br>Used by gunner | 1 |
| 5310-00-194-0636 | WASHER, FLAT:<br>To attach spent brass ejection chute | 2 |
| 1025-00-369-9000 | WIRING HARNESS: For Switch Assy Cmdr's Control<br>Provide power to commander's control switch | 1 |

# APPENDIX D
# ADDITIONAL AUTHORIZATION LIST (AAL)

## Section I. INTRODUCTION

### D-1. Scope

This appendix lists items required to support the AR/AAV M551/M551A1 during operation but not required to place it in operation.

### D-2. General

Additional Authorization List. A list of those additional expendable items, to include spares, repair parts, and common tools required by the operator/crew to support the end item during operation but are not required to place the end item in operation. The quantity of each item in this list is the maximum amount required to support one end item. The commander may determine the quantity of each item required based on equipment density. These items should not be turned in with the end item.

## Section II. ADDITIONAL AUTHORIZATION LIST (AAL)

| NATIONAL STOCK NO. | DESCRIPTION CREW USAGE | QTY REQ'D |
|---|---|---|
| 6240-00-155-7836 | LAMP, INCANDESCENT: .04 AMP No. 327<br>Replace gun and turret control selector | 3 |
| 6240-00-019-3093 | LAMP, INCANDESCENT: .37 AMP No. 623<br>Replace dome light lamp | 1 |
| 6240-00-950-1727 | LAMP, INCANDESCENT: .08 AMP No. 757<br>Replace personnel heater lamp | 1 |
| 6240-00-019-0877 | LAMP, INCANDESCENT: .23 AMP No. 1251<br>Replace taillight lamp | 1 |
| 6240-00-044-6914 | LAMP, INCANDESCENT: 1.02 AMP No. 1683<br>Replace B.O. drive lamp | 1 |

| NATIONAL STOCK NO. | DESCRIPTION CREW USAGE | QTY REQ'D |
|---|---|---|
| 6240-00-295-2668 | LAMP, INCANDESCENT: .61 AMP Mo. 1691<br>Replace dome light lamp | 1 |
| 6240-00-155-7967 | LAMP, INCANDESCENT: .10 AMP No. 1813<br>Intercom set control lamp | 1 |
| 6240-00-155-7864 | LAMP, INCANDESCENT AZIMUTH IND:<br>Replace Azimuth indicator lamp | 1 |
| | (Box for all above lamps in BIIL) | |

# APPENDIX E
# EXPENDABLE SUPPLIES AND MATERIALS

## Section I. INTRODUCTION

### E-1. Scope

This appendix lists items required to operate and maintain the AR/AAV M551/M551A1.

### E-2. General

Expendable Supplies and Materials. A list of expendable supplies and materials which are required by the operator/crew to operate the end item and perform allocated maintenance functions. These items are listed for information purposes and should not be turned in with the end item.

## Section II. EXPENDABLE SUPPLIES AND MATERIALS

| NATIONAL STOCK NO. | DESCRIPTION | CREW USAGE |
|---|---|---|
| 8040-00-262-9025 | ADHESIVE: General Purpose, 4 Oz. Tube | Hatch seals and pads |
| 8040-00-262-9028 | ADHESIVE: General Purpose, 1 Pt. Can | Hatch seals and pads |
| 8040-00-664-4318 | ADHESIVE: Syn. Rubber, 1 Pt. Can | Headlight assembly |
| 6850-00-243-1992 | ANTI-FREEZE: Type I, 1 Gal. Can | Engine cooling system |
| 6850-00-558-1248 | ANTI-ICING AND DEFROSTING FLUID: 1 Gal. Can | Periscope washer |
| 8020-00-224-8024 | BRUSH, ARTIST | Clean periscope and telescope lens |
| 8020-00-244-0153 | BRUSH, ARTIST: Flat Chisel | Clean MG components |

| NATIONAL STOCK NO. | DESCRIPTION | CREW USAGE |
|---|---|---|
| 8020-00-297-6657 | BRUSH, PAINT: Sash Oval | Cleaning vehicle and equipment |
| 7920-00-291-5815 | BRUSH, WIRE: Type II | To aid in cleaning vehicle and equipment |
| 5350-00-221-0872 | CA CLOTH, ABRASIVE: Crocus, 50 Sheets | To aid in cleaning equipment |
| 6850-00-227-1887 | CLEANING COMPOUND: Lens, 1 Qt. Can | To clean optical and fire control lens |
| 6850-00-224-6657 | CLEANING COMPOUND: Rifle Base, 6 Oz Can | To clean weapons |
| 6850-00-224-6656 | CLEANING, COMPOUND: Rifle Base, 2 Oz Plastic Bottle | To clean weapons |
| 6850-00-597-9765 | CLEANING COMPOUND: Solvent, 1 Gal. Can | To clean vehicular equipment |
| 5350-00-192-5047 | CLOTH, ABRASIVE: Aloxide, 80 Grit, 50 Sheets | To sand surface prior to painting |
| 5350-00-192-5049 | CLOTH, ABRASIVE: Aloxide, 120 Grit, 50 Sheets | To sand surface prior to painting |
| 5350-00-192-5051 | CLOTH, ABRASIVE: Aloxide, 180 Grit, 50 Sheets | To sand surface prior to painting |
| 5610-00-782-5553 | COMPOUND: Non-Slip O.D., 1 Qt. Can | To paint non-slip surfaces |
| 5610-00-782-5556 | COMPOUND: Non-Slip O.D., 1 Gal. Can | To paint non-slip surfaces |
| 8010-00-297-0560 | ENAMEL: Alloyd, Lusterless O.D., 1 Gal. Can | Spot paint |
| 8010-00-297-2109 | ENAMEL: Semi-Gloss O.D., 1 Pt. Can | Spot paint |
| 8010-00-598-5936 | ENAMEL: Semi-Gloss O.D., 12 Oz Can (Pressurized) | Spot paint |
| 8018-00-297-2105 | ENAMEL: Semi-Gloss O.D., 1 Gal. Can | Spot paint |
| 6810-00-242-3645 | ETHYL ALCOHOL: 1 Gal Can | To clean missile subsystem lens |
| 9150-00-935-1017 | GAA GREASE, AUTO ARTILLERY: 14 Oz Cartridge | To reload grease gun |
| 9150-00-190-0904 | GAA GREASE, AUTO ARTILLERY: 1 Lb. Can | To lube according to LO |
| 9150-00-190-0905 | GAA GREASE, AUTO ARTILLERY: 5 Lb. Can | To lube according to LO |
| 9150-00-257-5370 | GG1 GREASE, GRAPHITE: 1 Lb. Can | Cupola race ring seal |

| NATIONAL STOCK NO. | DESCRIPTION | CREW USAGE |
|---|---|---|
| 9150-00-985-7244 | GIA GREASE, AIRCRAFT AND INSTRUMENT: 4 Oz Tube | Turret tray mech gun fire cont equipment |
| 9150-00-754-2595 | GMD GREASE, MOLYBDENUM DISULFIDE: 1 Lb. Can | Recoil mechanism |
| 9150-00-905-9100 | GO LUBRICATING OIL: Grade 80, 1 Gal. Can | Trav mech gear box |
| 9150-00-261-7904 | GOS LUBRICATING OIL, GEAR SUB: 1 Qt. Can | Trav mech gear box |
| 9150-00-269-8255 | GPS GREASE, AIRCRAFT: 1 Lb. Can | Cupola hatch seals |
| 9150-00-985-7099 | LUBRICATING OIL: Air Compressor, 1 Qt. | Air compressor |
| 9150-00-265-9425 | LUBRICATING OIL: Engine OE10, 1 Qt. Can | Engine and transmission |
| 9150-00-242-7602 | LUBRICATING OIL: Engine OE5, 1 Qt. Can | Engine |
| 9150-00-265-9433 | LUBRICATING OIL: Engine OE30, 1 Qt. Can | Engine |
| 9150-00-664-6518 | LUBRICATING OIL: Instrument, 1-1/2 Oz Bottle | Fire control equipment |
| 9150-00-889-3522 | LSA LUBRICATING OIL: Semi-Fluid, 8 Oz Plastic Tube | Small arms |
| 9150-00-949-0323 | LUBRICATING OIL: Semi-Fluid, 8 Oz Plastic Tube | Ammo detent |
| 9150-00-292-9689 | LUBRICATING OIL: Weapons, Low Temp, 1 Qt. Can | Small arms |
| 9150-00-664-0038 | LUBRICATING OIL: Weapons, Low Temp, 4 Oz Can | Small arms |
| 9150-00-935-9807 | OH T, HYDRAULIC FLUID: 1 Qt. Can | Recoil mechanism |
| 8415-00-266-8843 | MITTENS, ASBESTOS, STOS, EA 2 2 | Hot MG Barrel |
| 9150-00-231-2361 | PL MEDIUM LUB OIL: GP 1 Qt. Can | Small arms |
| 9150-00-273-2389 | PL SPECIAL LUB OIL: 4 Oz Can | Small arms |
| 9150-00-231-6689 | PL SPECIAL LUB OIL: 1 Qt. Can | Small arms |
| 7920-00-205-1711 | RAG, WIPING: Cotton White, 50 Lb. Bale | To aid in cleaning vehicle and equipment |
| 6850-00-664-5685 | SD DRY CLEANING SOLVENT: 1 Qt. Can | To aid in cleaning vehicle and equipment |
| 6850-00-281-1985 | SD DRY CLEANING SOLVENT: 1 Gal. Can | To aid in cleaning vehicle and equipment |
| 7920-00-753-5242 | SCOURING PAD, NYLON: type 2 | To clean firing probe. |

| NATIONAL STOCK NO. | DESCRIPTION | CREW USAGE |
|---|---|---|
| 8030-00-134-3692 | SEALANT KIT | Air pressure gage |
| 8030-00-965-2438 | SEALING COMPOUND: 60 Ft. Roll | Head light |
| 6850-00-880-7616 | SILICONE COMPOUND: 8 Oz Tube | Gun/launcher |
| 1005-00-288-3565 | SWAB: Small Arms, 1000 Pkg | Small arms cleaning |
| 8135-00-551-1245 | TAPE, ADHESIVE: 6-Yd. Roll, 60 Yd. Roll | To mask vehicle while painting |
| 8010-00-242-2089 | TDN, THINNER PAINT: 1 Gal. Can | To thin paint |

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# GLOSSARY

Abbreviations used in this manual are defined below.

| | |
|---|---|
| ASP | ammunition supply point |
| cal | calibre |
| chg | charge |
| dr | drive |
| EFG | equivalent full charge |
| EOD | explosive ordnance disposal |
| ft | foot or feet |
| hdl | handle |
| hydr | hydraulic |
| in. | inch |
| lb-ft | pound foot |
| lg | long |
| LRF | laser range finder |
| MG | machine gun |
| O/A | overall |
| opng | opening |
| psi | pounds per square inch |
| pt | point |
| sgl | single |
| skt | socket |
| sq | square |
| std | standard |
| stl | steel |
| str | straight |
| tubr | tubular |
| wd | width |
| w/ | with |
| w/o | without |
| wt | weight |

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|---|---|---|---|---|
| | | | | (Write or PRINT, just put it down) |
| 2-18 | 2-8.d | | | Says: Rotate pin 60°<br>Should be: Rotate pin 90° |
| 2-149 | 2-59 | × | | THIRD PICTURE FROM TOP SHOWS SWITCH UP.<br>SHOULDBE DOWN. |
| 2-180 | 2-75 a-2 line4 | | | Says: HEAT-E-MP<br>Should be: HEAT-T-MP |
| 2-141 | | | 2-6 Item17 Step2 Line3 | Says: Replace 1-1/4V cell<br>Should be: Replace 1-1/2v cell |
| 3-49 | | | | HOW DO YOU REMOVE A RUPTURED ROUND FROM MAIN GUN?<br>Use more pictures and less print. |

SAMPLE

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